The RUBBER AGE

The Only Twice - a - Month Rubber Publication

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AKRON RUBBER PLANTS EXPECTED TO MAINTAIN OUTPUT AT PRESENT RATE

Factories are now Running at 87 Per Cent Capacity—No Curtailment Expected until after Election—Demand for Experienced Tire Builders Still Exists.

According to A. A. Beery, superintendent of the state-city free employment bureau in Akron, rubber factories are running on a basis of 87 per cent of capacity production. It is confidently expected that this level will be maintained for the next two months.

Mr. Beery recently said that the large rubber plants, which have been hiring thousands of new employees during the past few weeks, have practically ceased hiring unskilled labor. However, a demand still exists for experienced men.

Reports from various rubber factories indicate that production will continue at the present level until after the November election. But Akron is wary of booms and there is a tendency toward stabilization of production.

Firestone Adding Shift

For the first time in over three years the Firestone Tire & Rubber Co. is making preparations at this writing to put on a third shift at their No. 2 plant. It is said that alterations in the equipment of this factory are being made at a cost of $160,000. When these alterations have been completed, this plant will be devoted to the sole manufacture of Ford cord tires.

According to reports for August, Akron is the second city in Ohio for placing applicants for work. Cleveland is the leader. Of 3,531 male applicants during August 1,083 were placed by the state-city free employment bureau in Akron. The increase in female placements was in proportion. A total of 1,449 women applied for work and the bureau was successful in placing 437.

The production of tires by the large manufacturers in the Akron district is now running at a rate of approximately 90,000 casings a day, according to recent reports. This output is not only considerably in excess of production two weeks ago but is far beyond the expectations of officials of the large companies a month or more ago. The demand both from automobile manufacturers and from tire dealers has been much larger than was expected by the most optimistic.

Good business is also indicated by the July report of the Tire & Rim Association of America which shows that 1,325,168 rims were produced in that month. Of these 22.8 per cent were for balloon tires. Rims for 30 x 3½ tires comprised 58.04 per cent or 760,971 rims. Of this total 697,492 rims were of the clincher type and 73,479 were of the straightside type.

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CONNECTICUT RUBBER FACTORIES ARE BUSY

Most of the rubber factories in Connecticut are busy. The Hartford division of the United States Rubber Co. is operating at capacity with a maximum force. The plant is operating continuously on a 24-hour basis from Monday morning until Saturday night; there are no indications of curtailment at this writing.

L. Candee & Co. in New Haven another U. S. Rubber Co. subsidiary, recently started on a five-day schedule in the rubber specialties department, which had been operating on a curtailed schedule.

The Allyn Rubber Corp. of Norwich is not only operating at capacity but shortly expects to enlarge its facilities. Sales rights for the Pacific Coast and Hawaiian Islands for a period of ten years have just been sold.

With a normal working force, Goodyear's India Rubber Glove Manufacturing Co. at Naugatuck is operating five days a week on footwear production and five and a half days on rubber druggists' sundries. Officials at this plant describe business as "fair."

Business was said to be satisfactory by officials of the Norwalk Tire & Rubber Co. at Norwalk. The plant is operating at capacity with three eight-hour shifts. Operations on this basis are expected to continue through the remainder of September and through October at least. Orders are being received in increasingly large volume and for some time the factory has been unable to supply the demands of customers promptly.

Rename Goodyear Subsidiary

According to a recent announcement made by Charles A. Stillman, secretary of the Goodyear Tire & Rubber Co., Akron, Ohio, the Goodyear Export Co., a subsidiary, has been reincorporated. New authorized capital is $6,615,000.

The new corporation is to be known as the Goodyear Rubber Plantations Company. The move, said Mr. Stillman, combines Far East organization with the organization handling the Goodyear plantations in Sumatra.

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HEAVY IMPORTATIONS OF RUBBER CONTINUE TO COME IN AT BOSTON

Total of 9,082 pounds of Crude Rubber, Valued at $1,826,500, and 141,644 pounds of Gutta Percha, Valued at $5,956, Received at Massachusetts port in Last Seven Months.

Crude rubber continued to come into Boston in large quantities. Nearly every vessel coming from the Far East, South America, London, Liverpool and Antwerp has at least a few hundred cases.

The rubber factories of New England and the mid-west, more especially the tire establishments, have shown considerable improvement since last July, when an unexpected flurry developed. Stocks of crude rubber were found to be well depleted and to meet the situation, all spot lots that were available were immediately bought up. New York stocks were completely cleaned up and London stocks, always heavy, were reduced close to the bed rock of free spot stocks. One factor in the upward trend of the market was the strengthened shipping restrictions imposed on the English plantations of the Malay Peninsula. They are permitted to ship only a specific percentage of their rubber and rumors this spring that they were to be allowed to ship more, were followed by new regulations putting further restrictions on the output.

Receipts Continue to Grow

Boston has been getting more rubber imports for some time, as shown by statistics, compiled from Custom House figures.

This has been particularly true since a delegation from the Rubber Association of America recently visited this city as guests of the Maritime Association of the Boston Chamber of Commerce and were shown the facilities of the port for handling such merchandise. In this connection, it is pointed out that a factor militating against even larger imports of rubber through Boston, is the differential of eight cents per hundred pounds in favor of Baltimore. Shipments going through to Akron and mid-west points, obviously are routed through Baltimore whenever possible on account of this railroad disadvantage.

July Exceptionally Good

During the month of July alone, 1,620,221 pounds of crude rubber was imported at Boston, valued at $340,933 and, in addition, 46,872 pounds of gutta percha valued at $5,956. This compared with 509,966 pounds worth $115,372 for June and 837,461 pounds valued at $221,095 for July, 1923.

For the first seven months of this year, a total of 9,082,815 pounds of crude rubber were brought to Boston, valued at $1,826,500, in addition to 141,644 pounds of gutta percha worth $21,302. This contrasts with 18,985,444 pounds worth $5,471,881 for the entire calendar year of 1922, in addition to 70,753 pounds of gutta percha valued at $14,376.

Figures for the calendar year of 1922 were 9,430,380 pounds of crude rubber valued at $1,276,660 and 7,249 pounds jelutong worth $619. In 1921, the imports were 3,796,366 pounds valued at $442,429 and 21,000 pounds gutta percha worth 4,407. In 1920, crude rubber imports were 2,090,163 pounds valued at $756,117 and in 1919 they were 3,097,900 pounds worth $905,747.

Poplar Bluff Rubber Elects

At the annual meeting of the directors of the Poplar Bluff Rubber Co., Poplar Bluff, Mo., held recently the following officers were elected: J. L. Hines, president; W. H. Meredith, vice president; and O. A. McKinney, secretary-treasurer. The company manufactures inner tubes for automobile tires.

India to Build Addition

A three story addition 60 x 160 feet will be added to the factory of the India Tire & Rubber Co. at Mogadore, Ohio, according to a recent announcement made by President J. M. Alderfer. Plans for the new addition will be submitted immediately to the board of directors in order that work may be started at an early date.

Additional space is necessary to take care of the increased business enjoyed by the makers of India cord tires. Officials stated that the factory is now two months behind in its orders in spite of the fact that the plant is operating at capacity and producing 900 tires daily, according to Superintendent W. G. Lerch.

The expansion plans will enable the factory to practically double its output. The company is devoting much of its attention to supplying the demand for heavy truck tires.

RUBBER STREET-MARK TRIED OUT IN AKRON

John R. Gammeter, inventor, has added another achievement to his already long list by devising a new rubber street marking material that has been perfected by the B. F. Goodrich Company and tried out by the city service department of Akron at the intersection of South Main and Falor Sts. The device was developed to meet the demand for street guides or markings for the regulation of traffic. It is more permanent than paint and may be easily imbedded in the pavement.

INCREASED ACTIVITY IN BRITISH RUBBER PLANTS

(Special to THE RUBBER AGE*)*

The outstanding feature of the British rubber industry at present is its considerably increased activity. Within the last few weeks proofers and garment makers have virtually raced one another in their endeavor to carry out the orders which have been piling up, and the former have lost a certain amount of business due to sheer inability to rush contracts through at sufficient speed. Of course, this state of affairs does not depict any boom, but it is decidedly heartening to the trade generally.

The majority of garment makers have their hands full and several are booked up to the end of the year. While there is work in plenty, trade is not too profitable, however. Cheap lines form the bulk of production and profit on these is cut to the narrowest margin in order to compete with European nations which have the advantage of depreciated currencies.

Probably the brightest feature of the trade is the demand for tiling. The call for rubber-tiled floors at the Wembley Exposition was so great that considerable work in the North of England was held up in order to complete the Exposition contract in time. In the great rebuilding scheme, which is changing the face of London out of all knowledge, rubber tiling is playing an increasingly important part. It is being included in the furnishing specifications of a number of the new structures, one of the latest to be so equipped being the palatial home recently completed for the Anglo Persian Oil Co. Each of the upper stories of the building is tiled with rubber over the concrete floor. The tiles have been stained and each floor has its covering in a different color—grey on the first, terra cotta on the second, and so forth. The company find that rubber tiling wears very well and deadens the noise of many persons moving about in large offices.

Thermoid Branch Moves

The Chicago branch of the Thermoid Rubber Co., which has been located for twelve years at 2019 South Michigan Ave. has leased 10,000 feet of space on the third floor of the building at 3922 South Winchester Ave. The space will be used for warehouse and office purposes.

The factory in Trenton, N. J., which was established in 1869, is one of the oldest brake lining manufacturing companies in the East. Branches are maintained in five other cities. In addition to brake lining, the company manufactures tires and tubes.

Custom Tire Incorporated

A charter was recently granted to the Custom Tire & Rubber Co., Wilmington, Del. Authorized capital is $50,000. Incorporators are M. L. Rogers, L. A. Irwin and William G. Singer. The firm will manufacture and deal in tires for automobiles, motorcycles and bicycles.

NEW PROCESS OF BUILDING TIRES ANNOUNCED BY KELLY-SPRINGFIELD

Method makes Building of Tires with Bead as an Integral Part of Carcass Possible—No Flipper Strip Needed because Cords are Not Cut off at the Bead

A new process of building tires was recently announced by the Kelly-Springfield Tire Co. The process is said to have been adopted only after a series of experiments proved its many advantages. The new method makes it possible to build the bead as an integral part of the tire, thus fortifying a heretofore vulnerable spot, officials of the company said.

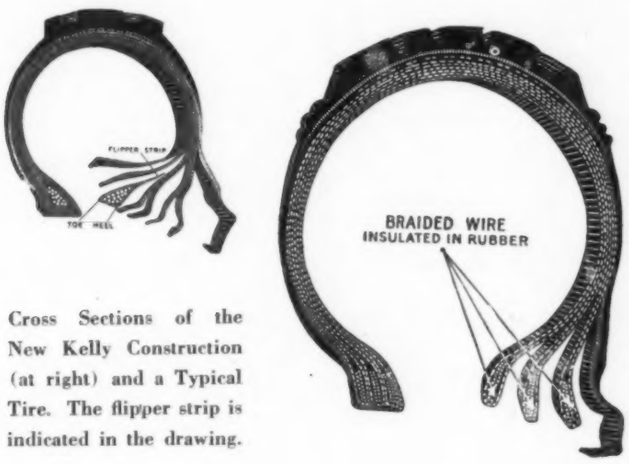
In the balloon and semi-balloon tire, with their large cross-section, their comparatively thin sidewalls and their low air pressure, a terrific strain is thrown on the tire just above the point where the bead is fastened in. In the new process, the wires that form the bead are firmly anchored in place; they cannot separate or pull out. The cords are continuous, from the beginning of the inner ply to the end of the outer. This means that instead of some 6,000 or 7,000 short cords, each cut off at the bead, the new Kelly construction uses only about 460 long cords, making a far stronger but more flexible tire.

The process by which all new Kelly cords will be built is said to make buckling and wrinkling of the layers of cord impossible as the tension of the cords is absolutely uniform.

In explaining how the Kelly process differs from ordinary methods, officials pointed out that all tires made by usual methods embody a bead which is composed of strands of braided wire insulated in rubber. This bead is built as a separate unit in the form of a ring and partly cured. It is then fastened into the tire by the plies of cord fabric which partially enclose it. These plies are not wrapped entirely around the bead but are cut off at the "toe" by some manufacturers and at the "heel" by others so that some plies extend along one side of the bead and some along two sides, but none around all three. The loose end of the plies are then covered by the chafer strip.

Most manufacturers also use a flipper strip which passes around the bead and extends an inch or two upward between two of the layers of cord. This flipper strip, Kelly officials say, helps to hold in the bead but also has a stiffening effect on the lower part of the sidewall so that the point at which it ends forms a sort of hinge where the flexing of the sidewall, particularly in the low pressure tire, is localized, making an acute angle or bend.

The elimination of the flipper strip is considered an achievement by Kelly engineers. Under the new method the bead is formed by enclosing strips of insulated braided wire in the loops formed by the cords, which, instead of extending merely from bead to bead, are continuous.



Cross Sections of the New Kelly Construction (at right) and a Typical Tire. The flipper strip is indicated in the drawing.

Mason Pays Bank Loans

The Mason Tire & Rubber Co., Kent, Ohio, recently announced that all direct loans with commercial bankers have been retired, and those of the last maturities have been taken up in advance of maturity dates.

The company placed on deposit with the trustees the funds necessary to meet interest upon its $2,000,000 first mortgage 7 per cent bonds several weeks in advance of the maturity of the interest coupons which were due September 1.

Current indebtedness has been reduced from $1,171,000 on May 1, 1924 to $757,000 on August 1. Sales for the month of August far exceeded the monthly average for the past seven months, officials said.

Goodyear Sets Record

In keeping with efficiency methods utilized in every Akron rubber factory to speed up production with smaller overhead costs, the Goodyear Tire & Rubber Co., Akron, Ohio, points with pride to a new world's record established in August when Howard H. Chassagne's boys in the Tube Room turned out in one day 40,500 finished inner tubes. The department has been averaging 26,000 tubes daily in three shifts, but under pressure of demands from dealers the new record was made, and it is expected to stand for some time.

AZO BRAND ZINC OXIDES
A PRODUCT WORTHY OF YOUR USE
AMERICAN ZINC SALES CO.
DISTRIBUTORS FOR
AMERICAN ZINC, LEAD & SMELTING CO.
COLUMBUS, P. O. Box 1428 ST. LOUIS, Pierce Bldg. NEW YORK, Prudence Bldg.
Warehouse Stocks—New York, Boston, Montreal, Philadelphia, Cleveland, Cincinnati, Toledo, Indianapolis, Louisville, Chicago, St. Louis, Omaha, Dallas, New Orleans, Trenton, San Francisco, Los Angeles.
Zinc Oxide Plants: Hillsboro, Ill., and Columbus, Ohio.
PURITY
UNIFORMITY
DURABILITY
AZO ZINC OXIDES
Azo ZZZ Lead Free
Azo ZZ—Under 5% Leaded
Azo Z—8 - 10% Leaded

RESTRICTION EFFECTS IN F.M.S. REPORTED

A few weeks ago publicity was given to a statement made by H. A. N. Bluett, British Commercial Agent for the Dutch East Indies, to the effect that Dutch producers had increased their output by an amount greater than British output had been reduced under the Stevenson plan, which, it was argued, had in consequence not produced the benefits expected from it.

Sir W. George Maxwell, Chief Secretary of the Federated Malay States, has despatched to the Government an interesting commentary on the position. He gives the total amount of rubber exported from the F.M.S. last year as 102,818 tons, against 129,404 tons in 1922. The "standard production" on Oct. 31, 1923, was 162,350 tons, of which 107,557 tons was in respect of estates over 100 acres, 10,793 tons from holdings between 25 and 100 acres, and 44,000 tons from small holdings. These figures show that in the F.M.S. alone restriction kept more than 60,000 tons of rubber off the market last year. With unrestricted tapping the budget would have been far greater than the "standard production," which shows that even though the Stevenson scheme has not met expectations as to maintenance of prices, it has stopped the flood of an unwanted commodity.

Personals

Richard T. Griffiths, vice president and factory superintendent of the Miller Rubber Co., is spending a vacation with his family in Canada.

J. T. Johnson, vice president and factory manager of the American Rubber & Tire Co., Akron, has just returned from a two weeks vacation.

L. A. MacQueen, advertising manager of the B. F. Goodrich Co., has returned from a three week's vacation trip in Wisconsin.

TREND TOWARD SIX-PLY BALLOONS SEEN

It is the belief of many rubber manufacturers, motorists and dealers that, although sacrificing the extreme comfort given by the four-ply type, the six-ply balloon tire is more practical. It is said that semi-balloons in four-ply are not strong enough to withstand striking rough obstructions, as are true balloons. Unless properly reinforced at the bead, semi-balloon tires may rim cut.

Spring controlling devices have been found necessary for satisfactory results from all low pressure tires. Drivers of medium-weight cars experience an annoying wall action in four-ply balloons. It is believed that all low pressure tires will be built stronger in the future.

Open Branch at Los Angeles

The Webster-Brinkley Co. of Seattle, San Francisco and Portland, manufacturers and jobbers of transmission, screening and conveying machinery and mechanical rubber goods, has taken a lease on the one-story brick building at 303-305 East Third St., Los Angeles, Cal., where it will maintain a branch.

The new location is in the heart of the machinery and belting district, and is served by a spur track of the Southern Pacific. The Webster-Brinkley Company handles the products of the Webster Manufacturing Co., Chicago, Ill., and also acts as Pacific Coast selling agent for the Gutta-Percha & Rubber Manufacturing Co., New York City, manufacturers of mechanical rubber goods.

The Los Angeles branch will maintain an engineering department, which, together with its Chicago and Seattle factories, will enable it to give complete service. A machine shop will be operated for key seating, shafting, pulleys and sprockets. I. Boyd will have charge of the company's interests in Los Angeles.

Diploma Awarded for this Display

The Faultless Rubber Co. was awarded a Diploma of Honor for this exhibit at the Brussels International Exposition. It was the only American rubber company to receive such an award.

M.A.M.A. CONVENTION PROGRAM ANNOUNCED

Sessions devoted to the business outlook, to improved merchandising methods, to foreign trade and to the handling of credits will make up the annual convention of the Motor and Accessory Manufacturers Association, to be held in Cleveland, October 15, 16, 17.

W. O. Rutherford to Speak

The convention will be given variety by the assignment of separate chairmen for the various sessions. M. L. Heminway, general manager, announced that G. Brewer Griffin, president of the association and head of the automotive division of the Westinghouse Electric & Mfg. Co., will preside at the opening session, when the subject will be, "The Outlook for Better Business." One of the speakers at this session will be internationally known financial authority who will talk on the general outlook. This will be followed by a three-part discussion of the automotive outlook by Alfred Reeves, general manager of the National Automobile Chamber of Commerce; W. O. Rutherford, president of the Rubber Association of America and director of the M. & A.M.A. and vice president of the B. F. Goodrich Rubber Co.; and Mr. Griffin.

To Discuss Better Business

At the second day's session on, "Better Merchandising as the Foundation of Better Business," E. P. Chalfant, chairman of the board of the Gill Mfg. Co., will be chairman. This session will continue morning and afternoon, with speakers on selling through the jobber, distributor and other channels and with a talk on tie-up of manufacturers' and wholesalers' advertising activities. One of the speakers at this session will be J. H. Mehan, manager of the Research Club, an organization of non-competing jobbers, who will talk on, "The Jobber's Place in the Automotive Selling System."

On the evening of the second day, F. E. Titus, second vice president of the B. F. Goodrich Rubber Co., will preside over a discussion on, "The Foreign Trade Opportunity; How to Take Advantage of It." Speakers will talk on the foreign trade outlook and on selling the foreign trade through an export department and through an export sales agent. One of the speakers will be J. F. Kelly, export manager of the Electric Storage Battery Co.

The third day will be given over to credit work, with a manufacturers' and foreign trade credit session, the morning presided over by M. A. Moynihan, secretary and treasurer of the Gemmer Mfg. Co., and a session on jobbers' credits in the afternoon with R. S. Harvey, vice president of the Rees Mfg. Co., as chairman.

Sessions will be held at the Hollenden Hotel in Cleveland with the local arrangements in charge of C. E. Thompson, president of Steel Products.

An unusually large attendance is expected by those in charge of the arrangements.

DEMAND FOR BALLOON TIRES GROWING FAST

"The balloon tire is now growing in popularity more rapidly than ever," says J. Hauvette Michelin, head of the Michelin Tire Company. "It is now evident that a new tire era has arrived which will eventually witness the use of balloon tires by all motorists.

"The latest statistics published by *Motor World* show that of the 111 different models of automobiles, which are being offered to the American public, sixty-eight models—or 61 per cent of the total—are equipped with balloon tires—some without extra charge and some at an extra price.

"Among the prominent car manufacturers who are now offering balloon tires as standard equipment without extra cost are Buick, Case, Chandler, Chrysler, Cleveland, Essex, Flint, Hudson, Jordan, Moon, Overland, Peerless, Rollin, Stanley, Wills.

"Michelin has now made over 1,000,000 balloon tires. We believe this is more than have been made by any other manufacturer. But others have made balloon tires in considerable quantities, at that. It is the record of these tires that accounts for the rapid growth of balloon tire sales to-day. The period of uncertainty is past. The new tires have proved their superiority."

TIRE DEALERS REPORT LOWER INVENTORIES

Tires and tubes in the hands of dealers have shown a marked decrease, according to an analysis of the returns of the July 31 questionnaire which is regularly sent to all members by the National Tire Dealers' Association. A feature of the results is a large increase in the number of members reporting, as compared with the previous questionnaire.

Officials of the association consider the reduction in inventories a very hopeful sign. Heavy stocks have hitherto been a serious problem for dealers, according to previous questionnaires. Sales and collections are reported fair. The number of members who have signified their intention of attending the annual convention of the N.T.D.A. to be held in Akron, Ohio, November 18, 19 and 20 has been very satisfactory, according to George J. Burger, president.

Ask Review of Knox Report

Stockholders of the defunct Knox Tire & Rubber Co., Mt. Vernon, Ohio, which failed several years ago, recently received letters from the "stockholders' committee" of Columbus, in which the claim is made that "the stockholders have not gotten what is due them." The letter is signed by H. A. Kellar, John P. Adamson, Beulah Smith and Edna E. Longshore.

It is stated in the letter that the trustee has just filed his final report and that several of the Columbus stockholders have had the bankruptcy proceedings investigated, with the result that they are, on advice of their attorney, suggesting to the stockholders "immediate action to secure our legal rights in the matter and an equitable distribution of the funds."

The statement is made in the letter that "according to the trustee's account more than $21,000 has been paid out to attorneys; about $6,000 for alleged clerical services and about $14,000 has already been distributed to a part of the stockholders, to the exclusion of all the other stockholders." The committee claims that "the expenses of administering this estate have exceeded the debts of the original company."

The committee desires to bring the matter before the United States court for review and asks the stockholders to authorize the committee to employ counsel on a contingent fee basis, the counsel to receive an amount not to exceed forty per cent of the sum recovered for each stockholder.

The action the committee wishes to take has no relation to the company now endeavoring to put the rubber factory into operation. This company bought the holdings and has no connection with the original project.

Henderson Increases Capital

An application of the Henderson Tire & Rubber Co., Buffalo, N. Y., for an increase in authorized capital from $650,000 to $725,000 was recently approved by the Secretary of State.

Why Bury the Meat of the Paper?

Because we felt that our readers are just as much interested in the messages of our advertisers as they are in the reports of daily news happenings, we decided to place every advertisement, wherever possible, right next to reading matter.

What would you think of an important news happening if it was placed in an obscure, hard-to-find corner? You want to see it out in the sunlight, don't you?

To our mind there is just as much news contained in every advertisement as there is in the average news report. So why bury one and feature the other?

Our readers will find that the new arrangement is even more satisfactory than the old—and of course advertisers will appreciate our efforts to render them better service by displaying their messages where they will be *seen* and *read*.

THOSE FIRMS in the industry who are not represented on the pages of THE RUBBER AGE should write for complete information to-day. Get your message out to rubber buyers now—production schedules are being increased and more of your equipment or supplies may be needed.

Tractors for Hauling Rubber

A certain Brazilian firm recently purchased a tractor for hauling rubber along the Jacy-Parana River, in the inland State of Mattor Grosso. Experiments will be made with this tractor in a country where good roads are non-existent; if they prove an advantage several more machines of a similar type will be ordered. This is said to be the first experiment of its kind undertaken in Brazil.

German Rubber Trade Poor

The rubber industry is suffering from the general credit shortage in common with practically all German business, Trade Commissioner F. W. Allport, Berlin, informs the Department of Commerce.

The only salvation for the present would seem to be an increased export trade but then comes into consideration the fact that the rubber manufacturers neglected the foreign market at the time when German currency was stabilized last November and put all their attention to satisfying home demands which at that time had backed up from the long inability to buy with worthless paper money. Thus at present the industry finds itself unable to look either for an adequate outlet at home or abroad.

JULY EXPORTS OF RUBBER GOODS MUCH HEAVIER THAN THOSE OF LAST YEAR

10,000 Tires, 9,000 Tubes and 1,600 Solid Tires More Exported last July than in July, 1923—Exports of Scrap Rubber Doubled this Summer—Rubber Thread Declines

Exports of rubber manufactures during June were valued at $3,473,898, and during July at $3,514,696, as compared with $3,556,344 and $2,894,397 in the corresponding months for the preceding year, writes E. G. Holt of the Department of Commerce. Over 10,000 more casings, 9,000 more inner tubes, and 1,600 more solid tires for trucks were exported in July, 1924 than in July, 1923. The July, 1924 total was also aided by heavier shipments of tire repair materials, canvas rubber-soled shoes, rubber belting and packing, and druggists' rubber sundries. Exports of scrap and old rubber were twice as great as in July, 1923, the shipments of 2,476,023 pounds being the heaviest during any month since January, 1921. Exports of rubber thread, which established a new high monthly total of 175,940 pounds in June, 1924, declined to only 51,081 pounds for July, but the combined figure for the two months was considerably higher than for the corresponding two months of 1923.

Recovery in Export Tire Trade

The tire trade seems once more to be definitely on the recovery. A year ago at this time tire exports from the United States were declining steadily and rapidly, partly as a result of the abnormally heavy tire exports during the first half of 1923, and partly because of the intense price competition in foreign tire trade.

Exports of mechanical rubber goods in July continued satisfactory, consisting of 304,099 pounds of rubber belting, 390,210 pounds of rubber hose, and 188,067 pounds of rubber packing. The figure for packing is larger than for any previous month since January, 1923, with the exception of April, 1924, when 195,909 pounds were exported. Since these products are used in all sorts of industrial establishments, the healthy export trade indicates steady activity of foreign industries, mines and railroads.

The export trade in waterproof rubber footwear is normally rather dull in the second quarter of the year, but during the third quarter begins to pick up.

July exports of rubber soles and heels amounted to only 176,302 pounds, which, although exceeded in only three months of 1923, is considerably below the average monthly shipments of over 200,000 pounds for the first half of 1924.

The trade in druggists' rubber sundries was heavier during July than in any previous month in 1924 except February. Water bottles and syringes were shipped in fair quantities to England, France, Argentina, Cuba, and China. Bathing caps exports during the month went principally to England, Australia, New Zealand, Canada and France, the July shipments being the lowest recorded since this class was first separately reported in January of this year. The small volume of the July trade is doubtless the result of the seasonal decline in demand in the Northern Hemisphere. The trade in rubber toys and balloons continued lively, shipments remaining at about the same level as in previous months, with England and Canada the outstanding markets, while important quantities went to the Netherlands, Sweden, Scotland, Mexico, Cuba, British India, the Philippines, Australia, and New Zealand.

Detailed statistics are given below.

Bristol Factory to Resume

It was recently announced that the factory of the National India Rubber Co., Bristol, R. I., will resume operations in the shoe division this month. It has been closed since June 28. The factory was opened September 16 for the cutting of tape but the first day's shoemaking will be done on September 29. The working schedule is five days a week. Operatives are returning at an average wage reduction of 18 per cent. Approximately 2,100 persons were employed in the shoe departments prior to the shutdown.

Champion Building Addition

Work was recently begun on an addition to the plant of the Champion Rubber Co., Kent, Ohio. The new extension will be 60 x 60 feet, two stories high, and of steel and concrete construction. Rubber tubing of various kinds is manufactured by the company.

Jack Smith, formerly with the Eclat Rubber Co., Cuyahoga Falls, Ohio, is superintendent of the Champion factory.

Texeel Damaged by Fire

Fire of unknown origin recently caused damage estimated at $1,500 at the plant of the Texeel Rubber Co., San Antonio, Texas. The factory is located at 320 Austin St. in a large frame building.

Exports of Rubber Goods from U. S.—July, 1924

Compiled from Statistics Furnished by the Department of Commerce

RUBBER BELTING, HOSE, PACKING, AND THREAD.

	Rubber Belting		Rubber Hose		Rubber Packing		Rubber Thread	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Totals	304,099	177,888	390,210	149,061	188,067	72,141	51,081	61,508

PNEUMATIC CASINGS AND PNEUMATIC TUBES

	Pneumatic Casings				Pneumatic Tubes			
	For automobiles		Other		For automobiles		Other	
	Number	Dollars	Number	Dollars	Number	Dollars	Pounds	Dollars
Totals	108,476	1,401,781	3,662	11,937	108,506	198,609	6,859	6,255

HARD RUBBER GOODS

	Battery jars and Accessories		Other Electrical Supplies		Other hard rubber goods	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Totals	50,040	16,367	3,224	3,087	23,336	28,030

WATERPROOFED AUTOCLOTH, RUBBERIZED FABRICS, ETC.

	Waterproofed Autocloth and Rubberizer Fabrics		Waterproofed Clothing	
	Sq. yards	Dollars	Pounds	Dollars
Totals	165,089	88,341	44,948	45,580

SOLID TIRES, ACCESSORIES AND REPAIR MATERIALS

	Solid Tires				Accessories and Repair Materials	
	For Automobiles and Motor Trucks		Other			
	Number	Dollars	Pounds	Dollars	Pounds	Dollars
Totals	8,415	214,089	80,407	23,473	121,511	50,630

RUBBER FOOTWEAR AND SOLES AND HEELS.

	Boots		Shoes		Canvas shoes with rubber soles		Rubber soles and heels	
	Pairs	Dollars	Pairs	Dollars	Pairs	Dollars	Pounds	Dollars
Totals	46,484	106,360	133,648	121,681	401,897	320,985	176,302	61,308

SUNDRIES, BATHING CAPS, RUBBER BALLS

	Water bottles and fountain syringes		other Druggists' Rubber Sundries		Bathing caps		Toy rubber balls and balloons	
	Number	Dollars	Pounds	Dollars	Dozen	Dollars	Pounds	Dollars
Totals	15,984	11,192	62,108	77,375	7,293	13,736	78,591	79,791

RUBBER CHEMISTS HOLD FALL MEETING IN ITHACA

The annual fall meeting of the Rubber Division of the American Chemical Society was held at Cornell University, Ithaca, N. Y., during the week September 8-13. Close to 100 rubber chemists attended the meeting, everyone of whom seemed to enjoy the several papers read and the events which transpired after the daily sessions. A good time was had by all.

In addition to the reading of papers by leading chemists, an election of officers was held at which the following were elected for the ensuing year: Chairman, C. R. Boggs, Simplex Wire & Cable Co.; Vice-Chairman, Winfield Scott, Boston Woven Hose & Rubber Co.; Secretary, A. H. Smith, Chicago, Ill. The Executive Committee now consists of E. B. Spear, Thermatomic Division of R. T. Vanderbilt Co.; Frank Kovaes, Seiberling Rubber Co.; Dr. A. A. Somerville, R. T. Vanderbilt Co.; L. B. Sebrell; E. H. Grafton, Quaker City Rubber Co.

Chairman Cranor of the Crude Rubber Testing Committee submitted a progress report which was discussed at considerable length. No report of the Physical Testing Committee was made. The next meeting of the Society will be held in Baltimore during the week following Easter, 1925, and the next annual meeting goes to Los Angeles, during the week of August 3, 1925.

There were only four papers read at the recent meeting, all of which were interesting and instructive to the members present. Of especial interest were the papers by Winkelman on "Pigment Variability" and "Mixing of Rubber Compounds" by Stringfield. Complete abstracts of the papers appeared in the September 10 issue of THE RUBBER AGE.

KLEINERT ADVERTISES LINE IN ROTOGRAVURE

The I. B. Kleinert Rubber Co., 485 Fifth Ave., New York City, took a full page in the rotogravure section of a recent Sunday issue of the *New York Times* to advertise its line of rubber goods. Dress shields, dress shield garments, household aprons, bathing caps, tourist cases, powder puff pockets, hose supporters, Miracle Reducers, Santalettes, baby pants, rubber sheeting and Shirlastic Ribbon are the most popular products manufactured by the company.

In the recent advertisement a rubber reducing garment called Miracle Combination, which is intended to reduce both the hips and bust, was given the most prominence.

Visit Dunlop Plant

H. C. Young and G. Sullivan, the former, general works manager of the Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham, England, and the latter an official of the Societe des Pneumatiques Dunlop, Montlucon, France, were recent visitors to the Dunlop Tire & Rubber Corporation, Buffalo, N. Y. Mr. Young and Mr. Sullivan were in the United States for about three weeks, spending their time between Buffalo and Akron, where they visited a number of plants.

H. C. Young and G. Sullivan

The purpose of their visit, as expressed by Mr. Young was to take a general view of up-to-date American methods, and to make a general survey of prices and conditions. Both visitors sailed for England September 3 on the Berengaria.

IMPORTS OF TIRES AND TUBES DECREASE IN JULY

During July the imports of tires and tubes into the United States numbered 17,217, less than half the number imported in the preceding month. The value of the July imports was $115,731. The unit value per piece in July was $6.72 as compared with $6.35 in June and $6.91 in May. The imports from France this year have consisted almost wholly of casings, rather than of an approximately equal number of casings and tubes. The imports by countries during the first seven months of 1924 are shown below.

IMPORTS BY COUNTRIES SINCE JANUARY 1, 1924

	France		Great Britain		Canada	
	Number	Value	Number	Value	Number	Value
January	18,001	$85,765	76	$1,702	64	$798
February	12,831	80,747	7	43	22	323
March	45,018	213,616	74	217	46	507
April	26,002	163,710	24	60	74	1,293
May	27,068	187,143	14	248	170	2,269
June	35,720	226,861	3	104	3	35
July	17,018	113,584	50	52	147	2,000

Charter Perfection Co.

The Perfection Rubber Co., with offices in Wilmington, Del., was recently granted permission to do business in New York State. The company will deal in rubber and rubberized products of many varieties. Authorized capital is $1,250,000.

William M. Tenney

William M. Tenney, head of the Clifton Manufacturing Co., Boston, Mass., manufacturers of rubber footwear, died recently in Wellesley Hills where he had been spending the summer. Mr. Tenney had been sickly only a few days. Interment was in Washington, D. C.

Mr. Tenney was born in Georgetown, D. C., January 12, 1843. He started the Clifton Manufacturing Co. in Jamaica Plain, a suburb of Boston, in 1902. The rubber company has another plant in Buffalo, N. Y. At one time Mr. Tenney was employed as assistant manager of the Washington banking firm, Jay Cook & Co. Later he became cashier of the National Bank of Minneapolis.

He is survived by his widow, Julia Tenney; two sons, David D. and Frank C. Tenney, who are engaged in the grain business in Duluth; and a brother in Washington.

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RUBBER ASSOCIATION TRAFFIC MEN CONFER WITH RAILROADS ON FREIGHT

Discuss Downward Revision of Carload Rates of Crude Rubber—Announce Reduction in Carload Rating of Reclaimed Rubber Effecting Points West of the Mississippi

The Traffic Committee of the Rubber Association of America held its regular monthly meeting in Cumberland, Md., on September 10 and 11.

The program contained a number of important subjects embracing the discussion of a range of questions such as "Lighterage Regulations in New York Harbor," "Ocean Bills of Lading," "Rates on Carbon Black from Texas Producing Points," and various technical questions concerning the classification of rubber products.

The most important subjects considered were those relating to the rates on crude rubber and the proposed revision of all the rates within Eastern territory that will be investigated by the Interstate Commerce Commission at an early date.

The Traffic Committee will present its proposal to the railroads' representatives through their Freight Classification Committee for a downward revision of the carload rates on crude rubber throughout the country. This subject has been before the Traffic Committee and the railroads for a long period and the result of investigation of this subject will be discussed at a joint meeting of the Traffic Committee and the Railroads Classification Committee about the middle of October, and it is hoped that the carriers may see their way clear to reduce the freight rates on crude rubber in carload shipments.

Eastern Rates on Improper Basis

The Interstate Commerce Commission has announced that in its opinion the rates for all traffic in Eastern territory are on an improper basis and require a general revision, and hearings will be held on this subject during the winter.

The Eastern railroads have made public their proposals to meet this situation.

An examination of the new scales of rates proposed by the railroads indicates that it will greatly increase the transportation charges of the rubber industry and for that reason the Traffic Committee is analyzing the railroads' proposals very carefully in preparation for the hearings that will be held by the Interstate Commerce Commission at an early date, in order to accurately determine its effect on the transportation charges of the rubber industry.

As a result of representations made by the Traffic Committee to the railroads Classification Committee at public hearings held in July, the Committee's request for a reduction in the carload rating on reclaimed rubber to and between points west of the Mississippi River from fourth class to fifth class was granted by the railroads.

At the same hearing, the railroads granted the request of the Traffic Committee for the establishment of carload rates on washers and gaskets to all points in the country by a reduction in the carload rates on rubber washers and gaskets from second class to third class.

Among those present were R. P. Bowe, traffic manager, Goodyear Tire & Rubber Co., Akron, Ohio, and chairman of the Traffic Executive Committee of the Rubber Association; R. H. Goebel, manager of the Traffic Department of the Rubber Association; J. A. Moore, traffic manager, Ajax Rubber Co., Inc., New York City; A. D. Phillips, traffic manager, Fisk Rubber Co., Chicopee Falls, Mass.; H. J. Zimmerman, traffic manager, B. F. Goodrich Co., Akron, Ohio.

E. C. Webster, Hood Rubber Co., Watertown, Mass.; T. C. Marshall, vice president, L. H. Ley, traffic manager and E. F. Hanlon, assistant traffic manager of the Kelly-Springfield Tire Co., Cumberland, Md.; E. L. Morgan, traffic manager, Miller Rubber Co., Akron, Ohio.

F. B. FitzGerald, traffic manager, New York Belting & Packing Co., New York City; T. R. Stoughton, traffic manager, Pennsylvania Rubber Co., Jeannette, Pa.; J. C. Wells, traffic manager, Philadelphia Rubber Works Co., Akron, Ohio; and G. F. Hichborn, general traffic manager of the United States Rubber Co., New York City.

Representatives of the principal railroad and steamship companies attended the conference.

STAMFORD RUBBER ASKS COOPERATION OF TRADE

The Stamford Rubber Supply Co., Stamford, Conn., recently mailed circulars and return cards to rubber manufacturers requesting their cooperation in an attempt to promote the standardization of a method for determining the acetone extract of Factice.

"The analysis of White and Brown Factice as used in the trade consists essentially of three determinations: ash, acetone extraction and free sulphur," says the circular. "Chemical specifications on Factice are largely based on these determinations and it is, therefore, important that the methods of analysis be standardized in order that these chemical specifications will designate more accurately the properties of Factice."

The determination of both the ash content and free sulphur content of a sample of Factice present little difficulty and are subject to but slight errors. The acetone extract, however, is a determination which is subject to considerable variation.

It is the belief of the Stamford Rubber Supply Co. that a standardized method of determining the acetone extract would be of great value to rubber chemists and it is solely for this reason that it is requesting the cooperation of the trade. Information received from rubber manufacturers will be tabulated and the results of the survey made known as soon as possible.

WHIPPLE AND CLAYTON QUIT FIRESTONE-APSLEY

The resignations of M. P. Whipple, in charge of the development department, and R. E. Clayton, chief chemist, were recently announced by the Firestone-Apsley Rubber Co., Hudson, Mass. Mr. Whipple, who has been in the employ of the Firestone company for a number of years, headed development work during the past year.

J. W. Woodward, who has been employment manager for several years, has been promoted. His appointment will take him to New York where he will do sales work. R. M. Godfrey, who has been with the company for several years, will take charge of employment as well as time studies. Arnold Davis is assuming the duties of chief chemist.

B. G. Work Goes to Europe

Bertram G. Work, president of the B. F. Goodrich Co., Akron, Ohio, sailed recently from New York on the *Majestic*. It is his intention to attend to business affairs in England, France and Germany.

Just before sailing Mr. Work made this statement: "Our business has been picking up every week since June. Our business is a barometer of general conditions and I am very pleased with the general outlook for the balance of the year. Business will be very good throughout the country. From present indications Goodrich earnings in the second half should be a little better than the first half. I am basing that on our business since the first of July. Sales of balloon tires are holding their own.

"If anything, tires are likely to advance, because crude rubber has gone up considerably, and if there is not a tire advance, it will be equal to a reduction. The crude rubber is very strong and I look for the price to remain about where it is for some time. We are producing about 25 per cent more tires than a year ago. We have not effected any further economies in our business since the last tire price cut in June. Since our acquisition of the Ajax company of England, there has not been a chance to show whether it was profitable. We are operating on a very small scale there now but expect to be at capacity by the end of the year."

Visit Firestone-Apsley

John W. Thomas, vice president of the Firestone Tire & Rubber Co., Akron, Ohio, accompanied by Chief Engineer Myers, recently made a tour of inspection at the factory of the Firestone-Apsley Rubber Co., Hudson, Mass.

R. H. MACY SELLS ITS OWN BRAND OF TIRES

R. H. Macy & Co., Inc., one of the largest department stores in New York City, opened on Sept. 8 a new department for the sale of automobile tires and tubes. "Supremacy" is the name of the new tire, which is made exclusively for Macy's and is guaranteed on a minimum service basis of 10,000 miles.

A distinctive feature will be the fact that the tire will be sold under the store's own guarantee; adjustments will be made by it directly with the consumer instead of by referring any complaints to the manufacturer.

A full line of popular sizes will be carried. The "Supremacy" is an oversized cord with a particularly large air cushion and side walls of exceptionally tough rubber. The tread is of long wearing, resilient rubber with a broad deep, non-skid design, specially treated to resist abrasion. The breaker strip is of high quality cord, impregnated with pure gum to afford perfect protection to the carcass. The carcass fabric, 15½ ounces to the yard, is made of extra long staple cord, gum dipped and carefully tested for tensile strength. There are 26 cords to the inch in the fabric.

Defiance Rubber Chartered

The Defiance Rubber Co., Defiance, Ohio, was recently incorporated by G. Sheets, L. Kirsch and M. R. Higgins. Authorized capital is $25,000.

RUBBER STERN BEARING INSTALLED ON SHIP

One of the largest rubber stern bearings thus far manufactured was recently installed on the tanker Freeport Sulphur No. 1, owned by the Freeport Sulphur Co. The work was done at the Galveston dry dock. The new rubber bearings, which were put on the market about July 1 by the B. F. Goodrich Co. after tests lasting four years, are to be tried on the tanker instead of lignum vitae wood bearings used heretofore.

The rubber bearing is 13 1-2 inches in diameter by 48 1-2 inches long. The fluted rubber wearing surface is vulcanized within a metal tube.

The manufacturers claim that the rubber bearing will last several years against a life of approximately six months for lignum vitae or metal bearings. Being close to the propeller and subject to the action of water, stern bearings do not stay in good condition long as sand, disturbed in crossing a bar or in navigating shallow water, works in between the shaft and the bearing and quickly cuts into metal or wood.

As the inner surface of the new bearing is of soft rubber, sand is said to have no great cutting effect on it. Spiral grooves help to expel particles of sand by the rotation of the propeller shaft. The life of rubber under water is unusually long because of the weak light. The water itself lubricates the shaft.

DISPUTES CLAIM OF MT. VERNON RUBBER TO SITE

The Mt. Vernon Chamber of Commere, in an answer to the amended petition of the Mt. Vernon Rubber Co., Mt. Vernon, Ohio, which, in its attempts to secure title to the site upon which its factory was erected, has filed suit in Common Pleas Court against Fred W. Kahrl, trustee, denies that the rubber company has kept its terms of the agreement under which the property was purchased, and asks dismissal of the petition.

The answer declares that the property was purchased with a fund raised by public subscription and that a large number of people are interested; that under the terms of the agreement the rubber company was to erect a factory building and operate it for a year with an average of 50 employees.

The answer denies that the Chamber of Commerce caused the auctioneer who sold the property to announce that the purchaser of the property would receive full title to it and denies that it ever changed any of the terms of the agreement, or had authority to change them.

North American to Open

The factory of the North American Tire & Rubber Co., Chicago Heights, Ill., recently sold at a receiver's sale will be placed in operation by the new owners about October 1, according to officials of the local chamber of commerce. The plant is expected to employ about 125 men.

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U. S. EXPORTS OF RUBBER HEELS SET HIGH RECORD IN FIRST SIX MONTHS

Mexico, the Philippines and Cuba were the Best Markets—Exports to Brazil Fell Off Due to Local Manufacturing Operations and a Protective Tariff

A high record for American export shipments of rubber heels and soles was established during the first six months of 1924, when 1,240,661 pounds valued at $440,311 were exported, according to E. G. Holt, Assistant Chief of the Rubber Division of the Department of Commerce. These exports compare with volumes of exports in previous semi-annual periods as follows: second half 1922, 1,078,428 pounds; first half 1923, 961,865 pounds; second half 1923, 941,637 pounds. Although both heels and soles are included in these statistics, it is known that heels make up the bulk of the shipments.

Sixty per cent of the exports during the first half of 1924 went to Mexico, the Philippine Islands, and Cuba, markets which naturally follow the American trend in footwear styles, and which have all adopted the use of rubber heels. Six additional markets, Argentina, the United Kingdom, Colombia, Venezuela, Canada and Uruguay, named in order of the volume of exports, accounted for another 25 per cent of the total trade, shipments to those markets ranging downward from 100,000 pounds to 20,000 pounds during the half year. The growth of American export trade in rubber heels has been particularly marked in Latin America. In the group of countries taking from 20,000 to 10,000 pounds of heels and soles during the six months are British South Africa, Newfoundland, and the Central American markets. A few European markets appear in the group of markets taking from 10,000 to 5,000 pounds, which include Spain, the Netherlands, the Dominican Republic, China, Haiti, Ecuador, Norway, Portuguese East Africa and Portugal.

Brazil and Chile Poor Markets

Two countries, Brazil and Chile, furnish notable exceptions to the rule that Latin American countries are good markets for American rubber heels. The local manufacture of rubber heels in Brazil, and by a protective tariff, has rendered importation of this product no longer necessary there. Brazil took 31,402 pounds of rubber heels and soles from America in 1922, and 9,186 pounds in the first half of 1923, but not a single shipment in the year ended June 30, 1924. Chile took 3,126 pounds in 1922; 2,146 pounds in 1923, and only 191 pounds in the first half of 1924. British manufacturers have had a considerable share in the Chilean trade, amounting to over 60 per cent in both 1921 and 1922, though the trade has not averaged over 10,000 pounds of rubber soles and heels a year.

British manufacturers are the principal competitors of American firms in the rubber heel export trade. In 1922, British exports of rubber heels and soles amounted to 2,120,000 pounds, a decrease of over 15 per cent in quantity as compared with 1921. While other exporting countries do not report statistics of the rubber heel trade, it is certain that Germany and France furnish considerable competition, especially in European markets. The ease with which rubber heel manufacturing may be carried on has led to the establishment in many other countries of rubber heel factories with limited production which in the aggregate constitute a growing competitive factor in their local markets.

BALLOON PRODUCTION DECREASES IN JULY

Rubber Association Reports Rise in Shipments of Balloon Tires but a Fall in Production over Previous Months—Inventory Reduced in July, Statistics Show.

The monthly statistical statement for July issued recently by the Rubber Association of America shows production of 365,213 balloon casings, as compared with 500,130 in June and 564,030 in May. These figures were tabulated from the reports of 52 manufacturers. Shipments, however, showed an increase. In July 393,132 balloon tires were shipped from factories, which compares with figures of 317,215 for June and 282,596 for May. And the fact that inventories were reduced in July indicates that the demand for high pressure cord tires is growing steadily. Inventory was 715,844 in July, comparing with 734,649 in June and 569,624 in May.

Production of inner tubes for balloon tires was 311,333 in July, which is a decrease from previous months. In June 436,279 low pressure inner tubes were produced and in May 467,488 were manufactured. Shipments of these tubes in July were 308,238, in June 259,550 and in May 213,469. Inventory in July was 708,098, in June 689,196 and in May 465,635.

Production in July of high pressure cord tires by 52 companies was 1,632,380, inventory 3,028,785 and shipments 2,148,581. These figures compare with ones for June of 1,530,872 production; 3,567,635 inventory; and 1,683,898 shipments. In July 3,545,956 high pressure inner tubes were produced. Inventory was 5,925,924 and shipments of 49 manufacturers were 5,084,015.

Ten manufacturers reported on solid and cushion tires in July. Production of solid tires was 30,570, cushion tires 11,928. Shipments were 41,468 solids and 9,981 cushion tires. Inventory of solids and cushions was 202,850.

Production of fabric tires was 554,736 in July, a decrease of 24.7 per cent over June figures and a decrease of 40.9 per cent compared with figures for July, 1923. Shipments of pneumatic fabric tires in July was 1,019,397, an increase of 35.5 per cent over June totals. Inventory was 1,393,845, a decrease of 24.7 per cent in comparison with figures for June.

EXPECT U. S. RUBBER TO PAY NEXT DIVIDEND

The recent sharp break of more than six points in the preferred stock of the United States Rubber Co. which brought the stock to below 82 gave rise to additional rumors that the dividend may be passed. But there seems little basis for such a belief.

Directors are slated to meet for dividend action October 2 at New Brunswick, N. J. According to certain executives, the regular quarterly dividend of $2 a share on the preferred stock will be declared.

The financial statement for the six months ended June 30, last, showed that the United States company had earned its preferred dividend requirements with a margin of more than $1,650,000 over. This was equivalent to $2.04 a share on the $81,000,000 common stock outstanding.

July and August sales have been entirely satisfactory in volume and it is practically certain that by the end of the current quarter preferred dividend requirements for the full year will have been earned.

FISK RUBBER REPORTS NINE MONTHS' PROFITS

The Fisk Rubber Co., Chicopee Falls, Mass., reports net sales for the nine months ended July 31 of $37,000,000., with operating profit after depreciation but before interest and other charges of $2,595,000., and net profit after interest, including bond interest, and other charges of $1,710,000.

It is estimated that the sales and net profits for the last quarter of their fiscal year will equal, if not exceed, that of the third quarter, which shows net sales of $14,000,000. with operating profits after depreciation but before interest and other charges of $1,145,000. and after interest, including bond interest, and other charges of $835,000.

Goodyear Declares Dividend

Directors of the Goodyear Tire & Rubber Co. of California recently declared the regular quarterly dividend of $1.75 a share on the preferred stock. No action was taken on the accumulated dividends due on this issue.

HEALTH SERVICE ISSUES BULLETIN ON POISONING

A bulletin on the prevention of lead poisoning in certain rubber-working industries recently issued by the United States Public Health Service reads:

"One of the methods recommended for preventing industrial poisonings in certain industries is the use of water or some other suitable liquid which, when mixed with the toxic substance, prevents its dissemination in the atmosphere in the form of dust. In this manner the hazard due to inhalation and ingestion of the substance may be materially reduced.

"At the present time many rubber-working industries utilize compounds of lead for the purpose of accelerating the vulcanization process. Certain of these industries also make use of substances of the nature of oils or petrolatum, known as "softeners," for the purpose of giving the final product a desired texture. The lead hazard in such a rubber-working plant has recently been brought to the attention of the Public Health Service. In this particular case, lead dust was disseminated in the atmosphere of the workroom at many points, practically every time the "batch" was handled by the workers prior to its final milling. As a solution of the lead-poisoning hazard at this plant, it was recommended that the litharge and petrolatum be prepared at a point removed from all other workers, and that this salve, composed of the proper proportions of litharge and petrolatum (8 to 1), then be brought into the compounding room and the requisite amount weighed out and added to each "batch." By this simple procedure the toxic dust was eliminated from all points in the workroom but one, and there it was in contact with only one worker.

"It is understood that some plants can not make use of such a method as the above; but this procedure may be of value to others in mitigating the lead-poisoning hazard."

Anderson Increases Capital

H. Anderson Tire & Rubber Co., Inc., Buffalo, N. Y., has increased its capital from $650,000 to $725,000 according to a certificate filed in the office of the Secretary of State through George C. Riley, attorney.

TRY OUT LARGER AND LIGHTER GOLF BALL

The United States Golf Association, which has been experimenting with a new golf ball, distributed several dozen rubber-cored balls made to the new specifications at a recent tournament over the National Links, near Southampton, L. I. The balls proved satisfactory. The present ball is 1.62, both for weight and size but the new ball is 1.55 ounces and 1.68 inches. The new sphere plays up to the old within six or eight yards on the average.

R. T. VANDERBILT ISSUES SHEETS ON THERMATOMIC

R. T. Vanderbilt Co., Inc., 50 East 42 St., New York City, recently issued to the rubber industry eleven printed sheets. Each shows the effect in high rubber stocks of increasing amounts of Thermatomic Carbon with various other ingredients manufactured by the company.

Thermatomic Carbon is a finely divided carbon made primarily for rubber compounding from natural gas. It differs from the usual carbon blacks in that it does not stiffen a rubber mix greatly. It should not be used to completely replace carbon black in stocks similar to tire treads but reasonable amounts may be used in treads in conjunction with zinc, carbon black and clay to good advantage.

Due to the fact that it makes a soft but tough mix, it is beneficial for use in certain stocks such as frictions and tubes.

Republic Doing Good Business

According to a statement recently issued by J. C. Connors, vice president and general manager of the Republic Rubber Co., Youngstown, Ohio, business done by the company in August exceeded that of any previous month this year with the sole exception of April. Outgoing shipments were at least 20 per cent larger last month than in July.

A good demand was reported from many centers, including Seattle, New Orleans, San Francisco, New York, Denver, Boston, Dallas, and Chicago.

NEW PLANS ANNOUNCED FOR 1925 AUTO SHOWS

The automotive industry has placed its stamp of approval on the recent decision of the National Automobile Chamber of Commerce to open the New York and Chicago automobile shows, in 1925, with two days exclusively for the trade. After a week of discussion the consensus of opinion among men of the industry seems to be that the change will bring about the greatest improvement of recent years in the national shows.

With very few exceptions all comments on the new plan have been favorable, especially among manufacturers of parts and accessories. Members of the Motor and Accessory Manufacturers Association, which participates in the conduct and assignment of space in the shows, have sent a flood of commendatory telegrams and letters to Neal G. Adair, show manager of the association. Parts and accessory makers feel that the new plan gives them far greater opportunity to meet prospective customers.

This year the shows will open on Friday morning and attendance will be limited on Friday and Saturday to men in the industry. On Saturday evening public attendance will begin and the shows will run the usual week from that date. Thus the show will be open in New York, January 2-10 and in Chicago, January 23-31.

Many manufacturers are already discussing the plan with their dealers and jobbers among whom wide interest has been shown.

In view of the added importance of the shows next year many manufacturers are planning to make special efforts in organizing exhibits of educational value. Men of high position in their respective companies will be on hand at the exhibits to meet and do business with them in the industry during the trade days.

Scrap Rubber Plant Damaged

Fire recently did several thousand dollars damage to the plant and stock of the Geneva Metal & Rubber Co., Geneva, N. Y. The company is owned by Solomon Bunis. A large portion of the stock of scrap rubber was totally destroyed and the building in which it was stored burned beyond repair.

Perfect Beads

Entire freedom from bead trouble in the construction of straight side tires is assured by the use of either National "(Patent)" High Tensile Strength, Flat Woven, Bead Braid or our new (Pratt Patent) Bead Cables. These cables, made to dimensions specified, have seven strands, yet only one piece of wire is used without soldered, welded or brazed joint.

Write for working samples of either National flat braid or Pratt cables (no charge to tire manufacturers) and full information as to our products and service.

Our engineering department tests beads and furnishes complete confidential reports as to their stretch, set and bursting point, without charge. Inquiries solicited regarding this special service.

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Unvulcanized Rubber made Plastic by Mechanical Treatment is an Ideal Substance for Studying the Viscosity Curve

By B. Marzetti

IT is well known that plastic materials flowing under low pressures through an orifice or a tube do not follow the law of Poiseuille. The velocity of flow is not a linear function of the force, but shows a convexity toward the pressure axis when represented graphically. This deviation from the law is usually attributed to secondary disturbing influences, such as the slippage of the material on the walls of the tube or the filtration of the liquid phase through the phase in suspension in cases where so frequently the experimental material is a solid dispersed in a liquid.

Rubber which has not been vulcanized but has been rendered plastic by mechanical treatment such as that imparted to it in the rubber industry is particularly suitable for studying the phenomenon in question. Because of its tendency to adhere to the surface of solids in general it does not tend to glide, while its homogeneity insures against all other disturbing influences.

Ordinary viscosimeters, even those of special construction for the study of plastic materials (plastometers), are not suitable to use with raw rubber. In fact such apparatus requires that the experimental material shall flow to the bottom of a receptacle by the action of gravity alone. This is not the case with crude rubber, which always maintains a certain degree of solidity and elasticity even when rendered plastic by mechanical treatment. For this reason an apparatus has been developed having a suitable receptacle with a conical base which in turn has an orifice allowing the flow of the material through its apex. The mass of raw rubber, fashioned roughly into a cylindrical shape is pressed against the conical surface of the base on closing the apparatus. This operation is sufficient to cause adherence so that when the pressure is applied, the rubber is in contact with the base and flows through the orifice without disturbance of flow by air. (1)

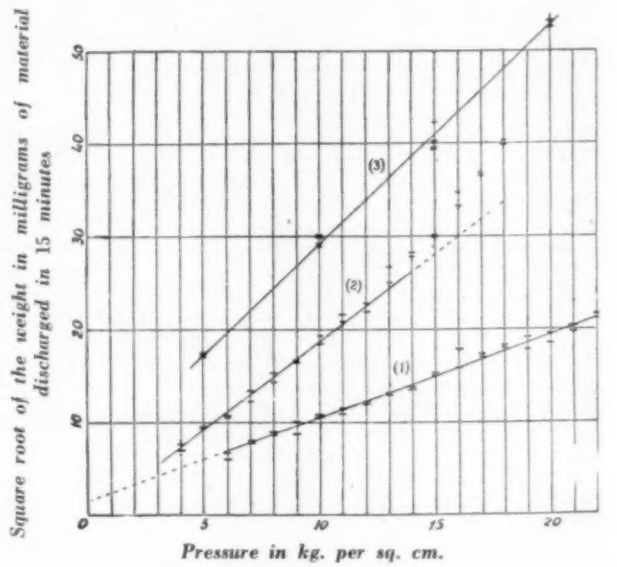
The objections to measurements by means of flow through an orifice have already been noted. Yet the experimental results to be described will demonstrate that at least for the material used and for a certain range of pressure the flow through an orifice follows a perfectly definite law, not different from that applicable to a tube of such dimensions that the movement of the material in the interior is at all times telescopic, i.e., the velocity of flow is proportional to the square of the force. That this law holds true appears from curve (1) of the diagram, which shows the flow of raw rubber (first latex crepe) sufficiently milled to render it plastic. The orifice of the apparatus was 3 mm. in diameter and the temperature 50° C. The abscissa represents the pressure and the ordinate the square root of the velocity of flow.

Extrapolation toward the zero value of the pressure indicates that the curve does not pass through the origin, but has a positive value on the ordinate representing the flow. This deviation from strict and simple proportionality has been confirmed by numerous experiments with rubber of varying degrees of plasticity and after various treatments and cannot be attributed to errors. The surprising result obtained by extrapolation indicates that at low velocities of flow the law involving the square of the force is not valid and therefore that the extrapolation toward the zero value of the pressure is not warranted.

Another deviation from the law is found at relatively high velocities of flow, which may be seen in the case of curve (2) in the diagram, which represents the same material as curve (1) but at 70° C. Above a pressure of 14 kg. per sq. cm. the relation is no longer linear and the deviation up to the highest values obtained experimentally is not such that the flow conforms to the law of Poiseuille, nor to that of Torricelli. On the contrary by increasing the pressure the velocity increases relatively faster than the square of the pressure.

In spite of these divergences the law of proportionality between the velocity of flow and the square of the pressure has been confirmed over a wide enough range and with sufficient accuracy to deserve attention.

It was of interest to determine whether analogous results could be obtained under conditions most favorable to telescopic flow. To this end smoked sheet rubber was made plastic by prolonged thermal treatment (4 hr. at 140° C), in addition to the mastication obtained on an ordinary mill. The plastometer was equipped with a tube of 4 mm. diameter and 50 mm. length. Under such conditions and at a temperature of 80° C data were obtained which are represented by curve (3) in the diagram. A single deviation from the linear form toward the zero value of the pressure is evident, whereas no second deviation occurs at high velocities of flow.



The tabulated data show the experimental results, from which curves (1), (2) and (3) of the diagram are constructed.

Kg. per sq. cm.	Milligrams discharged in 15 minutes (1)	(2)	(3)
4	——	57–47	——
5	——	87–90	300–290–295
6	35–45	115–110	——
7	60–82	180–150	——
8	77–75	235–205	——
9	100–75	270–270	——
10	105–105	370–337	897–885–845–840
11	130–115	465–434	——
12	145–147	520–477	——
13	170–172	712–620	——
14	185–192	800–775	——
15	235–222	887–895	1780–1530–1545–1617
16	314–243	1205–1100	——
17	285–300	1340–1335	——
18	325–320	1620–1597	——
19	365–312	—	——
20	382–340	—	2845–2765
21	415–390	—	——
22	460–450	—	——

[1] The apparatus is fully described in the Giornale di Chimica Industriale ed Applicata Vol. 5, pp. 342-3 (July 1923);—see also Chemical Abstracts 17, 3628.

*Translated by C. C. Davis from *Atti della Reale Academia Nazionale dei Lincei*, Vol. 32, pages 399-402 (1923).

Other series of determinations were made, with variations in the diameter of the orifice from 3 to 1 mm. In all cases the proportionality between the flow and the square of the pressure was found to hold true within a certain range.

Experiments were also made with other materials (putty and bread dough) to test the validity of the law, but in these cases great difficulties were encountered due to slippage or filteration (seepage) which affected the measurements. Nevertheless determinations under less unfavorable conditions seemed to indicate the same behavior as rubber, showing that the law is applicable to materials other than rubber.

Based on the experimental results explained above, it is possible to derive a few principles governing the motion of plastic materials.

The equation:

$$\frac{Q}{t} = K\,(F-f)$$

where Q is the quantity of material flowing out in time t, F is the force applied and K and f are constants, holds true for velocities of flow above a certain point, but is no longer applicable when the force approaches zero.

This deviation from the law cannot be attributed to disturbing influences which invalidate the experiment, for it has been verified in the case of a material for which in all probability such disturbances have been eliminated. It is an actual property of plastic materials under small pressures, and differs for each one. This is also emphasized by the fact that within a rather wide range a law which can be expressed in very simply analytical form is followed. Extrapolation like that in curve (1) toward the zero value of the pressure is not warranted and the constant f loses its physical significance as the force under which there is no flow, or in other words a static friction which impedes the continuous flow of the particles over one another. On the other hand the question can be raised whether such a static friction naturally exists. In other words is the distinguishing property of plastic material the absence of flow under a force below a certain limiting value? For the materials investigated absence of flow was not encountered even with the very lowest pressures used.

If moreover, as seems evident, there is no reason for regarding the movement in the tube in these experiments as different from the telescopic movement occurring when the law of Poiseuille was verified, then one is led to suppose that the mobility is not constant, but is a function of the velocity of flow. For example, due to the fact that the flow is a linear function of the square of the pressure, as has been verified over a certain range, the mobility ought to increase in proportion to the square root of the velocity. But in a different range the curve of the flow as a function of the pressure ought to coincide with the linear form demanded by the law of Poiseuille, and therefore the mobility ought to approach a constant value. The value expressed by the constant K in the equation above should then be the limiting value of the mobility for sufficiently great velocities of flow.

A Self-Vulcanizing Solution

The object of the process which is patented in British Patent No. 215,796 is to obtain a self-vulcanizing solution which contains india rubber, and which is to be used principally for repair purposes. The rubber, which may be mixed with zinc oxide, is combined with sulphur and zinc or cadmium normal or iso-propyl xanthogenate. The sulphur that is required for the vulcanization and the zinc or cadmium xanthogenates are kept apart until just before the self-vulcanizing solution is employed for repairing an inner tube.

For example, the solution consists of one hundred pounds of rubber, five pounds of zinc propyl xanthogenate, fifty pounds of zinc oxide and a solvent such as petroleum naptha, benzene, or carbon disulphide. When the solution is to be used, sulphur is added in the proportion of about eight per cent of the weight of the rubber. The solution becomes vulcanized at the ordinary atmospheric temperature in a period of approximately forty-eight hours. The time of vulcanization may be reduced by heating the mixture.

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Rubber Found in Central German Lignite

Tests Prove that Fossilized Product Called "Monkey-Hair" is a True Rubber — Lignites of Geiseltal High in Sulphur Content

E. KINDSCHER of the State Material Testing Station at Berlin-Dahlem reports in the *Berichte der Deutschen Chemischen Gesellschaft* the occurrence of rubber in Central German Lignite. The lignites of the Cöthen region occasionally show the presence of fibrous masses of a yellowish brown color, similar in appearance to animal hair with the adhering coal. Microscopic investigation shows the absence of any structure such as would be present in animal or vegetable fibers. On ignition this so-called "monkey-hair" gives off an odor similar to burning rubber. The "threads" have a circular cross section.

Results of Analysis

In order to test the material chemically, it was necessary to obtain it in a condition of relative purity. It was pounded in a porcelain mortar to crush and remove the adhering coal. The raw products, which seemed under the microscope to have the characteristics of a fossil resin, was then thoroughly extracted with acetone which removed about 1.5 per cent of a substance which was shown to be a resin. The residue had undergone a remarkable change in properties as a result of the removal of the resin. The individual fibers had become elastic and looked like threads of pure gum. Their resiliency was such that they could be stretched to 2½ times their original length. On heating in a test tube the odor was unmistakably that of burning rubber. On treatment with bromine in chloroform solution a bromide insoluble in benzine was formed exactly as in the case of rubber. Aqueous or alcoholic caustic did not affect it. These tests were fairly certain evidence that the material being tested was rubber.

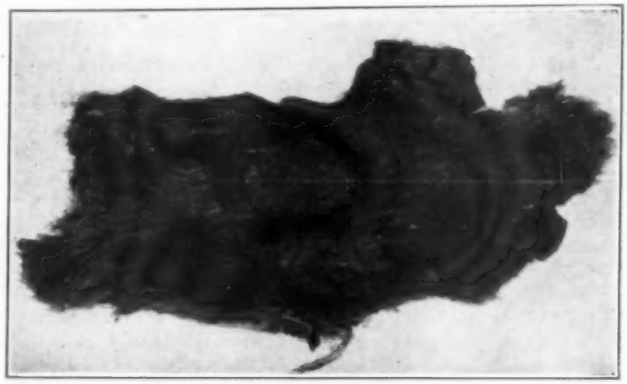
To make the test absolutely certain, a sample properly extracted by acetone to remove resins was heated first with aqueous caustic soda and then with alcoholic caustic to remove traces of lignitic products which are dissolved by this treatment which leaves rubber unaffected. It was then extracted with acetone again. The washed product consisted of light brown threads which had become a little sticky. Specks of dark material of lignitic origin were still present and these were picked out carefully by hand.

Tests Show Vulcanized Rubber

It was attempted to dissolve the threads in a rubber solvent (benzol) but the process was slow. Careful examination showed a relatively high sulphur content (2 per cent) indicating that the rubber was vulcanized and thus accounting for the low and slow solubility in benzol, in which, as is well known, vulcanized rubber merely swells. A sample was heated with benzol under pressure at 200°C. and went into solution just as vulcanized rubber does under the circumstances. The benzol solution was filtered, and dried and gave a product analyzing: Carbon 85.44; Hydrogen 11.53; Sulphur 1.92. The remainder is probably oxygen introduced by heating under pressure. The figures are in good accord with rubber. The pyridine solution reduces permanganate solution and the chloroform solution forms a tetrabromide with bromine exactly as in the case of rubber. The "monkey-hair" is therefore unquestionably fossil vulcanized rubber. The threads are undoubtedly due to the fact that the latex in the living plant exists in a network of intercommunicating capillary vessels. On the death of the plant and the drying of its tissues the contents of the capillary tubes remain as fibers of rubber. In this case the carbonization of the plant tissues in the absence of air permitted the rubber to exist unchanged except for vulcanization in place resulting from the release of sulphur or sulphur compounds during carbonization.

Similar inclusions are found in the lignites of Geiseltal. Purification, testing and analysis of this product gave the same general results as for the Cöthen inclusions, except that the product contained 17 per cent of sulphur. The adhering lignite is very high in sulphur (6.40 per cent) thus accounting for the higher degree of vulcanization found in this case. The product is in fact a fossil hard-rubber. The properties of the substance agreed exactly with those of a hard rubber.

Both types of "monkey-hair" in chloroform solution were subjected to the action of ozone. The usual rubber ozonide



A Specimen of Cothen Lignite

was formed and on treatment with water, levulinic aldehyde was formed.

Thus the existence of a fossil soft rubber and a fossil hard rubber was proved.

Compounding with Zinc Oxide

The process of compounding rubber which is described in British Patent No. 213,454 employs zinc oxide as a reinforcing agent in making the composition. The zinc oxide has an average particle size not exceeding 0.15 microns. It possesses the property of substantially accelerating the vulcanization of the rubber, and has the power of imparting to the rubber composition an increased resistance to abrasion. This increase amounts to about fifty per cent. Furthermore the tensile strength of the vulcanized products is increased very materially and the aging properties are increased.

This type of zinc oxide is manufactured by oxidizing an issuing stream of metallic zinc vapor by a blast of relatively cool air, so that the air envelops the issuing zinc vapor, and instantaneously cools the zinc particles below a temperature of 350 degrees C. The zinc oxide vapors may be diluted by other gases such as carbon monoxide, nitrogen, or hydrogen. The zinc is volatilized in an electric furnace at the rate of about five hundred pounds per hour, and the vapor escapes through a nozzle of about eight inches in diameter, surrounded by an annular air blast of 4500 cubic feet per minute.

The product is practically free from chlorides and sulphates and possesses an acidity of approximately 0.02 to 0.04 per cent of sulphur dioxide. It is found that this zinc oxide differs from the zinc oxide usually employed in that it produces a marked acceleration of the vulcanization without the presence of any other accelerator. The usual organic accelerators do not hasten the vulcanization in the presence of the zinc oxide, but produce a composition of higher tensile strength and greater stiffness.

The patent has been assigned to the New Jersey Zinc Co.

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Bicycle Tire and Inner Tube Manufacture

Drum and Mandrel Cured Bicycle Tires and a Method of Manufacturing Inner Tubes in Use in Europe

By B. W. Elberson

CONTINENTAL bicycle tire manufacturers seldom use quick-curing, steam-jacketed molds or light-built presses but prefer the band method of manufacture. Several of the larger factories make the fabrics, rims and the metal-base, inner-tube valves.

For the ordinary grades the former is a square woven, open duck (approximately 12 oz. weight) of a quality that will stand making up and vulcanizing with but slight deterioration, the breaking test being about 185 pounds. The high priced article is of cord construction, cemented and laid together by use of a short-base spreader equipped with revolving drum instead of steam table. These cords test to about 10 pounds and are wound on larger spools, which are set in front of the spreader in a series of racks, holding a thousand spools or more. The cords pass between guide wires, through heavy cement, then to a drum where a second coating is applied, this following the first at an interval of about three minutes. Alignment is sustained by tension; and a pair of rolls at the take-up end press the cords together, making (when thoroughly dry) a fairly solid sheet of fabric.

The process is slow, 12 to 15 inches a minute, one man tending several machines. These are not allowed to run out because rethreading would take considerable time. After laying a few days in the liner to harden, the fabric is spread coated on the barest side, or calender skinned. Cover stock is taken off a "front roll" calender, the extra thickness for tread turned out of roll surface. A conveyor belt attachment takes care of the strips, four of which are run and slit to required widths at the same time. Two men will cut off and book about 400 strips an hour.

Beading is run on a tubing machine and wire is coated in the same way, the former coiled in circular pans, 4 or 5 layers deep, and the latter wound on wide drums with a liner between each layer.

Building the Tire on a Curing Drum

Construction is done on the curing drum which is wide enough for two tires. These drums are of fine-grain metal, engraved with tread pattern and grooves cut for beads. Before starting to build, the surface is swabbed with thin rubber solution to hold the core firmly in position while the fabric (laid on without stretching) and beads are being attached to it. As each drum is completed it is placed in a rack, straight wrapped and then wrapped with soft wire equal to about 12 gauge.

The racks are six feet long with brackets and bars to support a drum at each end, also tension and driving apparatus. A guide block through which the wire passes is situated in the center, between the two drums, driven with a screw that lays it on in very close coil. A curved drum is placed at one end of the rack, and the wire leads from it through the guide block onto an uncured drum at the other end. Thus, a cured drum is unwrapped and an uncured drum wrapped at the same time. The operation takes less than a minute. The tire is then semi-cured in steam and, when removed from the drum, slipped onto a circular mandrel to shape it for the final cure.

These mandrels are made of ordinary pipe, in three sections, held together by loose-fitting plugs. After the tire is on the mandrel it is placed over a power-driven expander, having three arms with spread enough to stretch the tread portion to the right contour. Pins are then inserted in the plugs to prevent them from slipping back, and the mandrel with the tire on it is hung on a specially-designed rack in a vulcanizer large enough to hold 250 to 300 tires. The mandrel cure is usually done in compressed air which leaves the surface rather cleaner than if cured in open steam. Although the drum and mandrel method of manufacture does not produce quite as perfect a tire as the use of a mold, it has several advantages. Among these are a lower cost for equipment and simplicity of operation, consequently a smaller percentage of imperfect goods. Labor costs are much the same as the work of wrapping and shaping is about equal to that required for the molding process. Vulcanization under rigid pressure, as in molds, effects greater solidity and stiffness and therefore the tire is hardly as flexible as the drum-cured type. If made of the same quality of stocks, one method would probably produce as durable an article as the other. Cover stock for molded tires, however, is generally compounded with a percentage of finely ground waste or devulcanized scrap.

European Method of Making Tires

Continental inner tubes are nearly always made with tubing machines. The tubes are run with the bore slightly smaller than the pole on which they are to be cured and when cold are blown on the poles, allowance in the thickness of wall having been made for stretching. The ends only, for a length of two inches, are wrapped to prevent them from slipping back and shortening the tube; it also thins them for splicing and leaves a cloth impression for the cement. Curing may be done in compressed air or steam. After buffing and cementing the ends and the spot for the valve base reinforcing pieces, the latter are placed in position and the hole cut by a rapidly revolving punch, a wooden plug having been dropped into the tube to hold it against the punch. When this is removed the stripped valve is dropped in and the ends joined.

The cold cure is not generally used for joining the ends as it is not as reliable as an unvulcanized job unless very carefully done. Considerable attention is given to obtaining best results with the cement. Old Para only is used and this sheeted out thin and seasoned until it becomes very hard and dry. It is broken down just enough to dissolve into a smooth paste. Carbon tetrachloride and benzol are considered the best solvents, as the cement drys hard if these are employed. (The cement is always made several weeks before using as this is thought to improve its adhesive qualities.)

Mixes will be about as follows:

Inner tube stock		Cover stock		Spreader gum	
75%	No. 1 rubber	56%	No. 1 & 2 rubbers	67%	No. 1 & 2 rubbers
2	white substitute	1	substitute	1	powdered shellac
1	paraffine wax	10	whiting	14	whiting
7	zinc	6	magnesium carbonate	4	tar
8	magnesium carbonate	6	zinc	2	lime
2	litharge	5	tar	8	leads
1	calcined magnesia	9	barytes	4	sulphur
4	sulphur	4	leads		
		3	sulphur		

Soft Rubber Product Patented

A filled rubber product is made by subjecting it to the action of two reagents. One of these reagents is sulphur and the other is soluble condensation products of the phenol formaldehyde type. The sulphur content is less than five per cent of the total combined weight of sulphur and rubber. The product and its method of preparation has been patented in United States Patent No. 1,493,062.

VULCANIZATION & ACCELERATORS

By Andre Dubosc

PART 1 (*CONTINUED*)

Theory of Vulcanization

According to the Potts' Theory, in Vulcanization by Means of Sulphur Chloride a Chemical Reaction Actually takes Place—At Elevated Temperatures Only Rubber and Sulphur Additive Compounds Form

THE chemical theory of the vulcanization of rubber which was first suggested by Weber has remained for a long time the only one that appeared to be admissible. Nevertheless, when the colloidal character of rubber is taken into consideration, it appeared possible that in the action of sulphur and sulphur chloride on the rubber molecule, the phenomenon of adsorption may play a certain part in the vulcanization process. A series of a large number of experiments were made with the purpose of learning if the vulcanization of rubber was simply a purely chemical phenomenon or one which possessed physico-chemical characteristics.

The Potts Theory

The first experiments which were carried out along these lines were made by Henricksen and Kindscher, with a view of determining the nature of the equilibrium that existed between the chloride of sulphur and the rubber when these two substances were brought into solution by means of benzene. As it was impossible to make a direct analysis of the additional product that was formed, it was necessary to have resource to an indirect analysis which is often employed in colloidal chemistry.

After the two benzene solutions have been mixed together and a precipitate is formed, the clear supernatant liquid is siphoned off and the percentage of chloride of sulphur, which did not combine with the rubber molecule, is determined. As the total volume of the liquid was known, it was thereafter easy to calculate the percentage of chloride of sulphur that had combined with the rubber molecule.

The Form of Curve

The form of the curve that is obtained, when comparing the original content of chloride of sulphur that is employed in the process with the percentage or quantity of chloride of sulphur that is used up, makes possible a conclusion as to whether or not the process of vulcanization is intrinsically one of chemical combination or of physical adsorption.

In the latter case the equation must assume the following form: $\frac{x}{a} = k.c^m$. In this equation the symbol x stands for the quantity of sulphur chloride that is consumed in the vulcanization of the rubber; the symbol a for the concentration of the rubber in the benzene solution; the symbol c for the concentration of the chloride of sulphur at the outset in the benzene solution; the symbols k and m are constant.

Results Obtained

When this method is employed, a continuous series of curves is obtained. These curves start at zero and increase at first very rapidly, then more slowly and finally give an asymptote, which is parallel to the absiccae axis. On the other hand if a chemical compound were formed, then the consumption of chloride of sulphur would be constant.

The following results were obtained by causing different percentages of chloride of sulphur to react with half a gram of rubber:

Quantity of sulphur chloride used	Quantity of sulphur chloride absorbed
0.4330	0.2552
0.4330	0.2526
0.6495	0.2679
0.6495	0.2535
1.0825	0.2795
1.0825	0.2685
1.0825	0.2760
1.2990	0.2644

The conclusion that can be drawn from the results that are given in this tabulation is that the quantity of chloride of sulphur that is absorbed by a given weight of the rubber remains essentially constant, and that this proportion is independent of the quantity of the reagent that is added in excess. This leads to the further deduction that in the vulcanization of rubber by means of sulphur chloride chemical reaction actually takes place between the rubber molecule and the molecule of sulphur chloride.

The compounds $C_{10}H_{16}$ and S_2CL_2, rubber and sulphur chloride, have about the same molecular weight, 135 and 136 respectively, and the combination of the rubber molecule with 0.25 grams of sulphur chloride, that is 0.5 gram of rubber combines with this quantity of sulphur chloride, indicates that the formula of vulcanized rubber or of the compound that is formed between rubber and sulphur chloride will be as follows: $(C_{10}H_{16})_2S_2Cl_2$

These experiments then show that the vulcanization of rubber in the cold results in the formation of a new chemical compound, which is similar in nature to the tetrabromide of rubber that is formed by the combination of the rubber molecule and bromine. However the formation of this chemical compound between rubber and chloride of sulphur does not preclude the existence of an adsorption phenomenon and its playing an important role in the vulcanization of rubber.

The experiments which were made by Henricksen were conducted in the absence of any trace of moisture. But under ordinary conditions the humidity in the atmosphere makes possible a separation of sulphur from sulphur chloride and the formation of adsorption products. Industrial rubber articles that are vulcanized in the cold, must therefore be considered as products in which the rubber has adsorbed sulphur, the sulphur existing in the state of a solid or semi-solid solution in the rubber which may be in excess and in the addition products of sulphur that may have been formed during the process.

Equilibrium Between Sulphur and Rubber

With the idea in mind of studying the vulcanization process at a high temperature, Stern attempted to determine the status of the equilibrium that exists between rubber and sulphur at high temperatures. In order to carry on this research he employed naphthalene as the common solvent. The solution of rubber and sulphur in naphthalene was heated in a thermostat, and a series of samples of the mixture were subjected to the vulcanizing temperature for different periods

of time. Great care was taken to see that all factors were maintained constant during the course of the experiments. After the products that were obtained in this manner were subjected to extraction with acetone, for the purpose of removing any excess sulphur in the free state that might be in them, the samples were dried and then analyzed for the purpose of determining the percentage of combined sulphur.

The tabulation which is given below shows the results that were obtained in this series of experiments. The percentage of sulphur used was varied but the duration of the exposure of the mixture to the vulcanizing temperature was varied.

Solution of rubber in grams. (Ninety grams of naphthalene and five grams of rubber)	Sulphur in grams	Concentration	Grams of B_aSO_4 found per gram of vulcanized rubber
18.66	1.178	95:6 (1)	0.278 (1)
23.15	2.193	95:9 (1.5)	0.467 (1.7)
23.06	2.912	96:12 (2)	0.564 (2)

Discussion of the Results

These results show that, when the time of vulcanization is kept constant—in this case it was one hour at a temperature of 150 degrees C—the proportion of sulphur that is combined with the rubber in the vulcanized product is proportionate to the quantity of sulphur that enters into the reaction. It therefore follows, as was indicated by Ostwald, that in the vulcanization of rubber at elevated temperatures, only additive compounds of rubber and sulphur are formed.

The tabulation which follows shows what the influence of the temperature may be on the vulcanization process. In this experiment 5.07 grams of para rubber were taken and mixed with six grams of sulphur, the two being then dissolved in ninety grams of naphthalene. The temperature was maintained constant at 150 degrees C. The following results were obtained:

Time of vulcanization	Grams of vulcanized rubber	Percentage of fixed sulphur
1 hour 12 minutes	0.6689	2.8
0 hour 56 minutes	0.5496	4.7
1 hour 13 minutes	0.7762	8.9
0 hour 56 minutes	0.5784	10.0

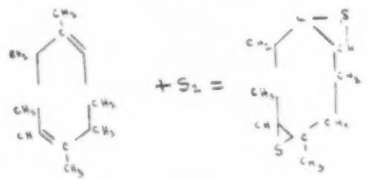
If the vulcanization of rubber is studied from the standpoint of the status of equilibrium that exists in the process, the inference that is formed is that the reaction between rubber and sulphur can take place at temperatures which are even lower than that at which sulphur fuses. But under these conditions the speed of the reaction is at a very minimum.

The experiments that were carried out by Martens shows that vulcanization of rubber is perfectly perceptible at a temperature as low as 70 degrees C, after rubber and sulphur have been allowed to remain in contact with each other for a period of several days. If these hypotheses are true, Potts concludes, it seems that under certain conditions the reaction that takes place between rubber and sulphur is reversible in character and it is possible to remove the sulphur that has entered into chemical combination with the rubber molecule from the vulcanized product. That is what has been demonstrated successively by Bary and Weydert, Dubose and Spence.

In fine, according to Potts, vulcanization of rubber in the cold corresponds to a phenomenon which is of the purely chemical order, and vulcanization at an elevated temperature is due to an adsorption phenomenon.

The Stevens Theory

According to Stevens there are two theories for explaining the changes that are produced in the physical and chemical properties of rubber when it is subjected to vulcanization. In accordance with the first theory the vulcanization of rubber is due to a combination, a chemical union between the hydrocarbon and sulphur. The reaction is as follows:



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PROFESSOR OF CHEMISTRY IN THE MUNICIPAL UNIVERSITY OF AKRON, OHIO

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In accordance with the second theory, the vulcanization would be due in the first place to an adsorption phenomenon.

It would actually seem that those who favor the physical theory of vulcanization are about ready to admit that there is a possibility of a chemical reaction taking place during the course of the process, that a combination of sulphur and rubber might possibly take place after adsorption, while, on the other hand those who hold to the chemical theory of rubber vulcanization are on their part ready to admit that a preliminary adsorption of sulphur can possibly take place before the metalloid combines with the rubber molecule.

Can A Vulcanized Rubber Be Obtained without Chemical Reaction?

It therefore now remains to be studied whether or not the technical results which are known to be derived from the vulcanization of rubber, could be obtained if no chemical reaction took place between the sulphur metalloid and the hydrocarbon molecule.

The experiments, which have been carried out in a systematic manner by Spence on this subject, and which are confirmed by most of the experimenters and investigators who followed him, show clearly that sulphur combines chemically with the rubber during the vulcanization process, when, for example, a mixture of sulphur and rubber is heated for an hour or two at a temperature varying between 130 and 150 degrees C. The rapidity of the reaction is dependent on the duration of the heating, when the temperature is constant. The coefficient of temperature is placed at standard condition at a point somewhere between 2 and 3, but it is affected to a considerable degree by the presence of catalysts or accelerators. Harries and Fontrobert, without critisizing or casting any doubt on the results that were obtained by Spence, have sought to show that vulcanization is a purely physical phenomenon, and that it is possible to prepare a vulcanized rubber which does not contain a trace of sulphur.

This conclusion was derived from a single experiment, which, it is true, was made with quite large samples of rubber. The experiment gave a vulcanized rubber, which after it had been subjected to a prolonged extraction with acetone, did not contain any sulphur, did not coalesce and was insoluble in all the common solvents. In brief this rubber product possessed all the properties of a vulcanized gum.

Stevens thought it advisable to subject such an experiment to exact control and here are the conclusions that he derived from it. The method, which Harries used in his experiment, is open to many criticisms. The gum, to which has been added ten per cent of sulphur, is cut into discs which are then vulcanized for a very short period of time, thirty minutes, but at a very high temperature, namely, 145 degrees C. The thickness of these rubber discs was from five to six millimeters. Now it is very doubtful that in such a short period of time it was possible for the heat to penetrate through a thickness of rubber corresponding to the above. The result would most likely be that the surface of the rubber would be vulcanized to a greater degree than other parts in the interior of the disc.

Dubosc's Theory Appears in the Next Issue

In the issue of September 25 the theory propounded by Andre Dubosc, the celebrated French rubber chemist and author of this comprehensive series, will be published. Mr. Dubosc bases his theory of the vulcanization of rubber on the change to which crystallized sulphur must be subjected before it will be absorbed by rubber and enter into chemical combination with it.

In view of the fact that Mr. Dubosc has specialized in the study of vulcanization phenomena, his theory calls for the earnest consideration of every rubber chemist. It will be read with more than usual interest by the chemist, who has followed this series, because of the many creditable theories that have been described and discussed in these articles thus far.

The Dubosc series has aroused more interest among rubber chemists than anything we have published in years and undoubtedly this interest will be intensified by the publication of the author's personal theory in the next issue.—THE EDITOR.

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EDITOR'S REVIEW DESK

Trade Catalogs **Books** **Articles**

THE RUBBER MANUFACTURERS' HANDBOOK. By W. Guy Pinkney and P. Watkins. Edited by Herbert Standring. 100 pp. 8 vo. Indexed. Bound in red cloth; stamped in gold. Published by The Rubber Age, 43 Essex St., Strand, London, W.C. 2

The avowed purpose of this volume is to afford the rubber manufacturer a series of tables and formulae in concise form. Among the subjects covered are: Atomic weights and analysis of rubber chemicals; heat conductivity and absorbing capacity of materials; tensile strength, hardness and specific heats of materials; composition of principal minerals and compounding ingredients; relative tensile strength and specific gravities of rubbers; weights of rubber cord and discs.

Weights, specific gravities and prices of compounding ingredients; equivalent temperatures and cures; tables of dimensions; tables of steam pressures; table of wire gages; conversion tables, washed and crude rubbers; details of belting for various purposes, etc.

The work will be found valuable as a reference for the compounder, the foreman and those in charge of costs.

* * *

THE ACCELERATION OF VULCANIZATION. By L. B. Sebrell and W. W. Vogt of the Goodyear Tire & Rubber Co. Published in the August issue of *Industrial & Engineering Chemistry.*

This article is devoted to the influence of the acetone- soluble constituents of rubber on the physical and chemical properties of accelerated rubber stocks.

All accelerators require soluble zinc in order to produce the best effects in physical properties due, it seems to the formation of a zinc-accelerator compound. There is no record of the isolation of such a compound, except with the mercapto accelerators, in which case the compound formed is believed to be the zinc salt of the accelerator.

Certain accelerators, such as diphenylguanidine and dimethlyamino-dimethyldithiocarbamate, react directly with zinc oxide to form the necessary zinc-accelerator compound. Others are dependent upon the presence of a rubber-soluble zinc salt. This salt may be formed by the reaction of resin acids on zinc oxide or added directly to the mix.

* * *

MALAYAN AGRICULTURE. Handbook. Second Edition. 301 pp. and index. Heavy board cover. Compiled by the Department of Agriculture, F.M.S. and S.S. on the occasion of the British Empire Exhibition, London, 1924.

This second addition, which was compiled by the staff of the Department of Agriculture, Federated Malay States and Straits Settlements, was published to draw attention to the various products displayed in the Agriculture Section of the Malaya Pavilion at the British Empire Exhibition, to point out the possibilities of new crops, to describe as concisely as possible the best methods of cultivation, harvesting and preparation of these products for the market and to indicate their market values.

Until recently, it is said in the introduction, little attention has been given to the possibilities of crops in Malaya other than rubber, cocoanuts and rice. "The remarkable rise and progress of the plantation rubber industry which, until the recent slump in prices, has been so successful in Malaya is chiefly responsible for this state of affairs. The comparative ease with which the rubber tree can be cultivated in Malaya, compared with the arduous work attached to the cultivation of crops such as sugar-cane and tobacco, is also another responsible factor."

Many pages are devoted exclusively to the cultivation of rubber. The advantages of planting selected stock and the great need for research along these lines is discussed. "The problem of selection of Hevea is still new and relatively unexplored territory and sorely needs the application of all our knowledge of genetics and horticulture in order to produce high yielding races of rubber trees."

Weeding and cover crops are dismissed with a paragraph. It is pointed out that green manuring is generally unnecessary but the results to be gained by manuring to improve poor yields are not considered seriously because manure rich in organic matter and nitrogen is available only to a limited extent in Malaya. After liming, the conservation of soil, the density of plantation, thinning out and tapping systems have been given some attention,the general trend of thought "to regard plantations as valuable permanent properties" is considered at length. It is admitted that the general knowledge of the rubber tree and the relationship of the latex to the general metabolism of the tree is still small.

The treatment of the latex and the subsequent treatment of the derived coagulum have not been neglected. Methods used in the manufacture of raw rubber are of great importance. Variability in plantation rubber which at one time was a distinct drawback to the use of this rubber compared with para rubber, in the opinion of manufacturers, has now been almost entirely eliminated. It is the opinion of the Department of Agriculture that if the middle man could be eliminated and the producer and consumer brought into closer touch, this problem would be entirely overcome.

But again price becomes a factor: "Any new method for the production of raw rubber, even though it produces a fundamental improvement in the intrinsic quality of the rubber for vulcanization, cannot become an economic proposition for the producer until a demand by the consumer has been established. The latter is, for the most part, absolutely unconcerned as to the development of new processes on the plantation or new types of raw rubber benefitting the planter, but strives rather to check any changes in the properties of a raw material which he has learned to know in one form, and to handle which he has adapted his machinery."

In speaking about future possibilities, the fear is expressed that no matter what method of preparation may be adopted the fuel problem in connection with the manufacture of smoked sheet will become critical. It is estimated that 220,000 tons of wood were consumed in rubber factories in 1919, being one ton of wood for every 185 pounds of rubber.

In the chapter devoted to plant diseases and pests, seven pages are taken up with a discussion of the diseases to which the rubber tree is heir. Plantation conditions are particularly favorable to the spread of diseases because in the jungle only the hardiest trees come to maturity but on the plantation many comparatively weak trees survive and each tree has a similar constitution to its neighbor.

* * *

THE PROVINCE OF SALES MANAGEMENT. 3½" x 6". Issued by the Policyholder's Service Bureau, Metropolitan Life Insurance Co., New York, N. Y.

In this booklet the eight helpful forms of sales control, the tests for determining the efficiency of sales organizations, and the suggestions as to the proper scope of sales management are covered. It is the seventh of a series of business leaflets. Eight sample forms for sales managers' and salesmen's reports are included.

MARKETS

Cottons and Fabrics

NEW YORK, September 15, 1924

Following our last quotations, the cotton market further declined due to beneficial rains in a large part of the cotton belt and also to an increased hedging pressure from the South. Private reports as to the condition of the drop gave it in most cases at above 61, while a local crop reporting agency placed the figure at 61.8, which indicated a yield of 13,327,000 bales, an amount approximately 50,000 bales below their last estimate. The Liverpool market also showed a loss of from 10 to 15 points over the recent holiday but with a considerable buying pressure in the market prices closed nominally unchanged from previous quotations.

During the remainder of the week the market was dominated to a great extent by the coming government report as to the crop condition. Prices fluctuated in a small range not only because the majority of the trade believed that the recent decline, which has taken place during the past few weeks, had discounted an estimated 13,000,000 bale crop but because they felt certain that, due to the many and numerous reports of crop deterioration coming in from all sides, the government would be forced to indicate an average considerably below the last report.

On the 8th the report as issued by the Department of Agriculture placed condition at 59.3, which was 5 points below the last estimate, and production at 12,787,000 bales, 169,000 bales less than the previous estimate. As a result of this reduction a heavy selling pressure came to bear on the market and the entire price list declined over a cent during the day's trading. Considerable buying interest both domestic and foreign was noted in the market at the lower levels while the reselling of contracts covered during the previous week met this demand, causing the tone of the market to weaken to a considerable extent. Closing prices were October 23.58, January at 23.00 and May at 23.47.

(Continued on Page 466)

LITTLE SMUGGLING OF MEXICAN COTTON

Although recent reports have been current that very large quantities of raw cotton have been smuggled into the United States from Mexico, these reports are denied by officials of the United States Department of Agriculture who state that it is a generally known fact that cotton is smuggled across the border line during the course of every year. They place the quantity at between 3,000 to 7,000 bales annually.

Many cotton growers in this country have been greatly concerned that the pink boll worm which is prevalent in Mexico might thus be brought into cotton growing sections of this country but due to the vigilance of custom officials and others the smuggling of cotton is now practically nil.

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Cotton Markets

(Continued from Page 463)

Cotton exports during the week ending September 6th showed 162,324 bales, a net gain of 131,020 bales over the previous week and 21,431 bales over the same period last year. Total exports from August 1st to September 5th amounted to 292,281 bales as compared with 324,085 for the same period in 1923. Cotton ginnings during this year up to September 1st amounted to 958,204 running bales which figure is 184,456 bales below last year.

On the 10th the market again suffered a further decline breaking approximately three-quarters of a cent. This was due to a heavy volume of selling taking place in the market. Liverpool and New Orleans also showed weakness and showed a loss at the close of the day's trading. On the 11th continued buying caused a slight recovery and prices at the close showed a net gain of around 30 points.

Recent word received from The International Cotton Refining Corporation states that this company will open its New Bedford plant early in September and it further makes the statement that thousands of bales of cotton, of every grade and staple, both foreign and domestic, have been refined by its process successfully.

New York Cotton Prices

	Open	High	Low	Sept. 15 Closed	Sept. 2 Closed
October	22.30	22.32	21.79	21.88	24.47
December	22.00	22.00	21.48	21.50	24.12
January	22.05	22.05	21.50	21.50	24.08
March	22.28	22.34	21.75	21.75	24.33
May	22.55	22.56	22.00	22.00	24.50

TIRE FABRICS

With continued activity reported in the tire trade, contrary to earlier expectations of many in the tire fabric industry, many mills, who during the recent months have been doubtful of their ability to keep their plants running due to lack of business are beginning to assume a more optimistic attitude, feeling hopeful that by the additional business placed they will be able to run their mills through 1925. The majority of the larger mills report that they have taken on a large volume of business for the last quarter of the year and probably could have taken on considerably more if orders had been taken.

The greater amount of interest displayed by manufacturers has been for the most part centered on the spot position and several tire makers are reported to have been forced to pay a premium for the available material. This continued spot buying is in the main part due to the cautious buying on the part of the tire interests during the early months of the year and also to the continued demand for tires. On the other hand there has been considerable buying on contract for the January/March position for with a shortage of goods on hand acknowledged by many of the larger factors in the tire trade due to the heavy liquidation of old stocks brought about by the increase in production, many do not wish to take the chance of a shortage in the future and an advance in prices.

To date prices have remained nominally unchanged with the spot position bringing a premium of two cents over the contract price. Carded peeler cord is obtainable in most directions in a quantity way at from 53c to 57c with 52c the low basis. One sale aggregating approximately 50,000 pounds was reported made at 58c for special construction. Carded Egyptian Cord which with Carded Peeler have come in for the most interest was sold in several directions for quantity at 63c for spot and 62c for contract business. Square Woven tire fabrics have also come in for their share of interest on the part of consumers with Carded Peeler 17¼ oz. construction quoted today at from 52c to 54c with sales reported passed in quantity at these figures.

The opinion expressed by many of the larger factors in the trade indicates that the market as a whole is assuming a healthier tone. Mills which are not running on cost-plus contracts are reported to be placing a fair amount of business against a comparatively steady demand and although in many cases, profits taken are small, a steady demand now encourages many to be optimistic as to the future.

CORD FABRICS

Combed Sakellarides		Nominal		
Combed Peeler	lb.	Nominal		
Carded Peeler	lb.	.53	@	.57
Combed Egyptian uppers	lb.	.72	@	.75
Carded Egyptian uppers	lb.	.62	@	.67

SQUARE WOVEN

17¼-ounce Egyptian uppers, combed	lb.	Nominal		
17¼-ounce Egyptian uppers, carded	lb.	.60	@	.65
17¼-ounce Sakellarides, combed	lb.	Nominal		
17¼-ounce Peeler, carded	lb.	.52	@	.54

Ducks—This market, like many others, remained quiet following the holiday period. During the past ten days, however, little activity has been reported with sales made of insufficient quantity to advance prices. On the other hand with the raw cotton situation showing of late an easier tone, sellers in this market have been inclined in many instances to lower their ideas and as a consequence concessions have been reported. Hose and belting duck continue to come in for the most interest with sales of over 100,000 pounds each noted during the past week at 43c to 45c.

Burlaps—Directly following the holidays a comparatively small amount of trading took place in the local burlap market with sellers in many cases inclined to shade their prices for quantity. On the other hand cables from the primary markets indicated a considerable amount of business passed in those centers with prices up from 3d to 6d. On the 5th in view of slightly easier cables buyers endeavored to purchase their requirements at figures below the market level but in most cases were unable to find sellers anxious to place business at a concession. A recent unconfirmed report indicated that the total for August shipments amounted to 72,000,000 yards.

The general opinion, however, among the traders is that although during the past week primary quotations showed a decline with lower sterling a declining factor, prices are firm with an underlying strength manifesting itself.

SHEETINGS

40-inch 2.50-yard	yd.	.16	@	—
40-inch 2.85-yard	yd.	.14	@	.14¼
40-inch 3.15-yard	yd.	.14¼	@	—
40-inch 3.60-yard	yd.	.11⅝	@	—
40-inch 3.75-yard	yd.	.10½	@	—
40-inch 4.25-yard	yd.	.09½	@	—

DUCKS

Belting	lb.	.43	@	.45
Hose	lb.	.43	@	.45
Enameling	lb.	.45	@	.47
Shoe Ducks	lb.	.49	@	.52
Single filling		.19	@	.22
Double filling	lb.	.22½	@	.23½

BURLAPS
(Carload Lots)

7½-ounce 40-inch		7.25	@	—
8 -ounce 40-inch		7.35	@	7.40
10 -ounce 40-inch		9.50	@	9.60
10½-ounce 40-inch		9.85	@	—

DRILLS

37-inch 2.75-yard	yd.	.14½	@	—
37-inch 3.00-yard	yd.	.13½	@	—
37-inch 3.25-yard	yd.	.12½	@	—
37-inch 3.50-yard	yd.	.11¾	@	—
37-inch 3.95-yard	yd.	.10¼	@	—

OSNABURGS

30-inch 7-ounce		.13¾	@	.14¼
40-inch 7-ounce		.15½	@	—

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Equitable Building, 120 Broadway, New York

SEA ISLANDS EGYPTIANS PEELERS

FABRICS TO SPECIFICATION

AMERICAN COTTON FABRIC CORPORATION

Crude Rubber

NEW YORK, September 15, 1924

More local speculative interest than demand on the part of tire manufacturers has continued to feature the crude rubber market. Although tire makers continue to enter the market from time to time in order to meet present requirements, there has not been sufficient buying in quantity to affect prices which have fluctuated in a radius of two cents for the past ten days.

Directly following the recent holidays the market showed little activity and prices remained nominally unchanged at the 27c level. The London market, due to lack of c.i.f. business, eased off 3/8d over a period of three days to 13½d buyers, which was finally reflected in the local market. Sellers here fearing a further easing off in foreign prices brought the nearby position down to 26⅜c with no buyers in evidence. Singapore advanced 1/8d.

On the 5th the market rallied and spot was offered at 27c with the Oct./Dec. position possible at 26⅞c. The trade was greatly encouraged by reports that Far Eastern shipments for this month would drop and several dealers in the trade expressed the opinion that with shipments for this month small and July and August arrivals at a minimum the spot position will continue to be very firmly held. London, due to better demand, registered an advance of ¼d during the day, closing at 13¾d buyers.

At the end of the week the market held quiet with prices unchanged. Tire centers in both New England and New Jersey reported a slight increase over the previous week. On the 8th the price list moved down ⅛c due to lack of buying interest. Local demand centered itself, however, on the Oct./Dec. position with a fair tonnage reported done at 26¾c. On the following day with higher London cables sellers advanced their ideas and offered nearby rubber in the market at 27⅛c, while on the 10th due to the failure of several boats to arrive prices gained another ¼c to a level of 27⅜c on the nearby position. Several large consumers bought heavily at this price fearing a squeeze with resulting higher prices. On the 11th sellers were quoting 27½c for spot with fair interest on the part of consumers and short speculators. During the remainder of the week, notwithstanding the fact that 2,611 tons arrived on three steamers, the list advanced to 28c sellers for nearby with London at 14-⅛d buyers.

NEW YORK MARKET

Plantations—			
Ribbed Smoked Sheets.			
Spot	.28	@	—
September	.28	@	—
Oct.-Dec.	.28	@	—
January-March	.28¼	@	—
First Latex, crepe, spot	.29	@	—
Amber Crepe No. 1, spot	.27¾	@	—
" " No. 2,	.27½	@	—
" " No. 3,	.27	@	—
" " No. 4,	nominal		
Brown Crepe, Rolled	.26½	@	—
" " Clean, thin	.27½	@	—
" " Specky	.26¾	@	—
Scrap, Colombo No. 1	.18	@	—
Pontianac—			
Prime Pressed	.14	@	—
Palembang	.08¾	@	—
Bangermassin	.08¼	@	—
Sarawak	.08	@	—
Paras—			
Up-river Fine	.27½	@	—
" Medium	.26½	@	—
" Coarse	.17½	@	—
Islands, fine	.25	@	—
" medium	.24½	@	—
" coarse	.17	@	—
Cameta	.18	@	—
Madeira Fine	.28	@	—
Acre Bolivian, fine	.27¾	@	—
Cut Beni Bolivian, fine	.27¾	@	—
Tapajos, fine	.26½	@	—
Xingu Ball	.15	@	—
Caucho Ball—			
Upper, shipment	.17½	@	—
Centrals—			
Central, crap, prime	.19½	@	—
Corinto, scrap	.19½	@	—
Esmeralda, sausage	.19½	@	—
Guayule, w and d	.28	@	—
Africans—			
Benezuela, No. 1	.18	@	—
" No. 2	.17	@	—
Congo, upper, black	.25	@	—
" red	.24	@	—
Kassai, Prime Red	.24	@	—
Balata—			
Black, Columbia	.52	@	.54
" Cuidad	.63	@	.64
Surinam, sheet	.76	@	.77
Gutta Percha—			
Siak	.18¾	@	—
Red Macassar	3.00	@	3.20
Chicle—			
Mexican, Yucatan	.64	@	.65

LONDON MARKET

Standard Ribbed Smoked Sheets—	
Spot	14⅜d
September	14⅜
Oct.-Dec.	14⅝
Jan.-Mar.	14⅞

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—	
Spot	13¾d
September	13⅞
Oct.-Dec.	14⅛
Jan.-Mar.	14⅜

Reclaimed Rubber

NEW YORK, September 15, 1924

Little change is noted in this market, with prices nominally unchanged. Consumers continue to place their inquiries in the market but the actual volume of business has been small. Many of the larger factors in the trade complain that at the present level of the market the margin of profit, due to high production costs, is practically nil but look for additional business during the coming months. Until consumption exceeds production there is little chance, in the minds of dealers, that an advance in prices will take place.

Floating Tube	.13	@	.13½
Friction, uncured	.21	@	.22
Boots and Shoes (unwashed)	.09	@	.09¼
Boots and Shoes (washed)	.12½	@	.13
Mechanical	.09	@	.09½
Hose	.09½	@	.10
Tires, truck	.07⅞	@	.08
Tires, auto, black	.09	@	.09½
Black (washed)	.10	@	.10½
White	.13¼	@	.13¾
Dark Gray	.09¼	@	—
Light Gray	.10¾	@	—

Scrap Rubber

NEW YORK, September 15, 1924

The market for scrap rubber continues unchanged in price from our last quotations. Dealers in the trade, however, report better interest displayed by manufacturers during the past ten days with the result that business placed has been of good volume.

Auto tire peelings	.01	@	.01¼
Standard White auto ....ton	20.00	@	22.00
Mixed auto .....ton	12.00	@	14.00
Bicycle tires .....ton	8.00	@	9.00
Clean solid truck tires	.01¼	@	.01½
Boots and shoes	.02¼	@	.02½
Arctics, untrimmed	.01	@	.01¼
Arctics, trimmed	.01⅜	@	.01⅝
Inner tubes, No. 1	.04	@	.04¼
Inner tubes, compounded	.02¼	@	.02½
Inner tubes, red	.02	@	.02¼
Battery jars, clean hard rubber	.02¼	@	.02½
Air Brake Hose .....ton	10.00	@	11.00
Rubber Hose .....ton	7.00	@	8.00

Chemicals

Turpentine—This market for the past ten days has been a quiet affair, with little activity reported by the majority of dealers.

Castor Oil—The tone of the market is very firm. Sellers in most cases have refused to make any concessions because production costs continue to remain high.

The Carter Bell M'f'g Co.
Highest Grade
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White, Brown & Black
150 Nassau Street New York

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"It runs much Smoother"—Says a user.
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"We like your D.P.G. very well. . . . It runs much smoother than some we have had from other sources."
Our X L O Accelerator is preferred by some for certain purposes.
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Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, Sept. 15, 1924—The market for industrial chemicals remains nominally unchanged as far as prices are concerned. Some factors report the volume of business placed during the past ten days as indicative of a better situation prevailing but others report only fair demand on the part of consumers, with the tone of the market uncertain. Many look for an advance in prices later in the fall when stocks on hand are more fully liquidated and consumption is taking care of current production. The trade as a whole, however, feels that the coming fall elections will have a material effect upon the market and the political situation at the present time brings uncertainty to the minds of all as to the future situation of the market.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .90 @	.95
Aniline oil, drums	lb.	.17 @	.17½
Diphenylguanidine	lb.	1.10 @	1.15
Excellerex,	lb.	.35 @	.40
Formaldehyde-Aniline	lb.	.40 @	.42½
Hexamethylene-tetramine	lb.	.82 @	.85
Paraphenylenediamine	lb.	1.40 @	1.50
Super-Sulphur No. 1	lb.	.50 @	.60
Super-Sulphur No. 2	lb.	.25 @	.35
Tetramethyl— Thiuramdisulphide	lb.	6.00 @	—
Thiocarbanilide, kegs	lb.	.26 @	.29
Vulcocene	lb.	.35 @	—

Inorganic

Lead, sublimed blue	lb.	.11 @	—
Lead, white	lb.	.10 @	—
Litharge, domestic	lb.	.10 @	—
Lime, Superfine	lb.	.02 @	.04
Magnesia, calcined, light,	lb.	.15 @	.18
extra light	lb.	.20 @	.24
heavy	lb.	.04 @	.05

COLORS

Blacks

Arrow "Acrfloted"	lb.	.06½ @	.10
Bone Black	lb.	.08 @	.11
Carbon "	lb.	.07 @	.11
Drop "	lb.	.07½ @	.10
Ivory "	lb.	.15 @	.45
Lamp "	lb.	.12 @	.40
Micronex	lb.	.08 @	.12

Blues

Cobalt	lb.	.52 @	.56
Prussian	lb.	.36 @	.39
Ultramarine	lb.	.06 @	.35

Browns

Iron oxide	lb.	.02¼ @	.06¼
Sienna, Italian,	lb.	.04½ @	.14
Umber, Turkey,	lb.	.04 @	.04½
Vandyke, domestic	lb.	.03½ @	.04

Greens

Chrome, light	lb.	.29½ @	.31
medium	lb	.32 @	.35
dark	lb.	.35 @	.38
Commercial	lb.	.10 @	.10½

Reds

Antimony crimson, 15/17 F.S.	lb.	.37 @	.44
sulphur free	lb.	.45 @	.60
golden, 15/17 F.S.	lb.	.20 @	.22
calcium and sulphur free	lb.	.40 @	—
red sulph.15-17 F.S.	lb.	.16 @	.20
Indian, English	lb.	.11 @	.12
Para toner	lb.	.95 @	1.00
commercial	lb.	.15 @	.18
Red Oxide, reduced	lb.	.08 @	.12
pure	lb.	.12 @	.14
Toluidine toner	lb.	1.85 @	2.10
Venetian red	lb.	.02 @	.05½
Vermillion, quicksilver, English	lb.	1.25 @	1.35
domestic	lb.	.15 @	.25

Whites

Albalith	lb.	.07 @	.07¼
Aluminum bronze		.55 @	1.25
Lithopone Azolith	lb.	.06¼ @	—
Zinc Oxide—American Process XX red	lb.	.07¾ @	.08¼
Kadox, black label, bags, cars		.11⅝ @	.11⅞
blue " " "		.10⅝ @	.10⅞
red " " "		.09⅝ @	.09⅞
American Azo: ZZZ (lead free)	lb.	.07¾ @	.08¼
ZZ (under 5 per cent leaded)	lb.	.07 @	.07½
Z (8-10 per cent leaded)	lb.	.06¾ @	.07¼
Zinc Oxide—French Process White seal	lb.	.12 @	—
Green seal	lb.	.10¾ @	—
Red seal	lb.	.09¾ @	—

Yellows

Chrome, light		.17 @	.18
dark and medium	lb.	.17 @	.18
Cadmium Sulphide	lb.	1.75 @	2.50
Ocher, French medium	lb.	.02⅛ @	.02¼
domestic	lb.	.01½ @	.02½

COMPOUNDING INGREDIENTS

Aluminum Flake	ton	25.00 @	40.00
hydrate light	lb.	.17 @	.18
Ammonia carbonate,	lb.	.13½ @	.14
Asbestine	ton	13.00 @	15.00
Barium carbonate	ton	65.00 @	68.00
Barium Dust	lb.	.05 @	.06
Barytes southern off-color,	ton	15.00 @	18.00
Western prime white	ton	22.00 @	23.00
Imported	ton	28.00 @	33.00
Basofor	lb.	.04¼ @	—
Blanc fixe, dry f.o.b. works	lb.	.03¾ @	—
Carrara filler	lb.	.01½ @	.02
Chalk, precipitated, extra light	lb.	.04¼ @	.05
heavy	lb.	.03¼ @	.04
Clay, China, domestic,	ton	12.00 @	15.00
Dixie	ton	22.00 @	32.00
Blue Ridge	ton	12.00 @	25.00
Fossil flour	lb.	.03 @	.05
Glues, extra white	lb.	.22 @	.30
medium white	lb.	.20 @	.26
cabinet	lb.	.18 @	.28
cabinet low grade	lb.	.15 @	.18
common bone	lb.	.10½ @	.13
Graphite flake, bbls.	lb.	.06½ @	.12
Lump	lb.	.04 @	.10
Infusorial earth, powdered	ton	60.00 @	—
bolted	ton	65.00 @	—
Liquid latex	gal.	1.25 @	1.35
Magnesia, carbonate	lb.	.08¼ @	.08¾
Mica, powdered	lb.	.07 @	.15
Rotten Stone (powdered)	lb.	.02½ @	.04½
Soapstone, powdered	ton	15.00 @	22.00
Starch, powdered	cwt.	3.17 @	3.27
Talc, domestic	ton	15.00 @	22.00
French	ton	18.00 @	22.00
French, high grade	ton	38.00 @	45.00
Italian	ton	45.00 @	55.00
Terra Alba	cwt.	1.25 @	2.00
Tripoli, white	lb.	.02 @	.02¼
Whiting, commercial	cwt.	.85 @	1.15
gilder's bolted	cwt.	1.10 @	1.20
English cliffstone	cwt.	1.50 @	—
Paris whiteAmerican	cwt.	1.25 @	1.50
Quaker	ton	13.00 @	15.00
Sussex	ton	8.00 @	16.00
Wood pulp XXX	ton	35.00 @	—
" " X	ton	25.00 @	—

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M.R.	ton	50.00 @	54.00
Hard hydrocarbon	ton	30.00 @	40.00
Soft hydrocarbon	ton	30.00 @	40.00
320/340 M. P. hydrocarbon (c. l. factory)	ton	45.00 @	50.00
300/310 M. P. hydrocarbon (c.l. factory)	ton	40.00 @	45.00
Synpro, granulated, M. R. (factory)	ton	55.00 @	70.00

SOFTENERS

Acids

Acetic, 28%	cwt.	3.12 @	3.37
Cresylic, 97%	gal.	.63 @	.68
95%		.61 @	.66
Muriatic, 20%	cwt.	.90 @	1.00
Nitric, 36 degrees	cwt.	4.25 @	4.50
Sulphuric, 60 degrees	ton	9.00 @	10.00
66 degrees	ton	14.00 @	15.00
Tartaric, crystals	lb.	.29 @	—

Alkalies

Caustic soda, 76%	cwt.	3.76 @	3.91
Soda ash, 58% C.L.	cwt.	1.43 @	1.45½

Oils

Castor, No. 3, bbls.	lb.	.16¼ @	—
Chinawood, bbls.	lb.	.15 @	—
Corn, crude, bbls.	lb.	.13¼ @	—
refined	lb.	.14½ @	—
Cottonseed, crude		.08⅝ @	—
Glycerine C.P. Drums	lb.	.19 @	.19½
Linseed, Raw C.L.	gal.	1.02 @	—
Palm, Niger	lb.	.07⅞ @	—
Lagos	lb.	.08⅛ @	—
Peanut,domestic,crude	lb.	.13½ @	—
Petrolatum, white		.12 @	—
amber		.05½ @	.06
dark amber	lb.	.05 @	.05½
Pine, steam distilled	lb.	.65 @	—
Rapeseed, refined	gal.	.87 @	.88
blown	gal.	1.00 @	—
Rosin, first rectified	gal.	.41 @	.42
second rectified	gal.	.45 @	.47
Soya Bean, crude		.12¾ @	—
Tar, commercial	gal	.30 @	.32

Resins and Pitches

Cumar resin, hard	lb.	.09 @	.10
soft	lb.	.09 @	.10
Parra M.R.	lb.	.06 @	.07
Tar Retort	bbl.	11.00 @	—
kiln burned	bbl.	11.00 @	—
Pitch, Burgundy	lb.	.65 @	.66
coal tar	gal.	.06 @	.08
pine	bbl.	5.75 @	6.00
Rosin, grade K	bbl.	6.30 @	—
Shellac, Superfine orange	lb.	.65 @	.67

Solvents

Acetone, drums C.L.	lb.	.17½ @	.18
Alcohol, denatured, No. 1 bbls.	gal.	.53 @	.57
Benzol, 90%	gal.	.23 @	—
pure		.25 @	—
Carbon bisulphide	lb.	.07 @	.08
tetrachloride	lb.	.07 @	.07¾
Dimethylaniline	lb.	.36 @	.37
Motor gasoline, steel bbls.	gal.	.18 @	—
Naptha, V. M. & P.	gal.	.17 @	—
Toluene	gal.	.31 @	—
Turpentine, spirits	gal.	.91 @	.92
wood	gal.	.80 @	.82

Waxes

Bayberry	lb.	.21 @	.22
Beeswax	lb.	.43 @	.45
Carnauba, No. 1	lb.	.36 @	.38
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb	.06 @	.06½
Ozokerite, black	lb.	.26 @	.27
green	lb.	.28 @	.29
Paraffine WhiteA.M.P.	lb.	.05½ @	.05⅝
Yellow A.M.P.	lb.	.05¼ @	—
Sweet wax	lb.	.12 @	—

SUBSTITUTES

Black	lb.	.08 @	.14
White	lb.	.09 @	.15
Brown	lb.	.10 @	.15
Brown factice	lb.	.10 @	.15
White factice	lb.	.09½ @	.16

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.25 @	.26
Sulphur Chloride (drums)	lb.	.06 @	.07
Sulphur flour Commercial bags,	cwt.	1.35 @	1.70
" bbls.	cwt.	1.70 @	—
Superfine, bags,	cwt.	2.00 @	2.40
" bbls.	cwt.	2.30 @	2.75
100% pure, refined, bags	cwt.	2.35 @	2.65
bbls.	cwt.	2.60 @	2.90

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No. 4 of a series of six *4. Gravities*

What is Tar?

Pine Tar

is a series of Hydro-carbons which can be combined or fractionated to produce a tar of any desired gravity or density.

Like a blended gasoline, tar by blending may be given any desired gravity but may be composed chemically of widely varying oils.

The crude oil of Pine wood, like crude petroleum, contains oils with varying gravities which in the pine oils range from a sp. gr. of .86 to 1.095. These oils may be topped, leaving an oil with a straight distilling range, of any desired gravity from that of the crude (1.01) to that of heavy tar (1.085) or they may be fractionated and some of the fractions reblended to give the same gravities as the straight run residue.

Both methods produce tars desirable in certain industries but having widely different chemical characteristics.

If a combination solvent and softener of a certain working density is desired, a blended tar can be secured to fill perfectly these requirements. If, however, only a softener is desired, the still residue is best.

Specifications calling for gravity alone may or may not secure uniformity, but gravity coupled with distillation range, if a pure pine product, will give uniformity.

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ABSTRACTS

All Rubber from Rubber Latex

The object of the process herein described is to recover practically all of the rubber from latex, instead of 25 per cent which is usually obtained. The latex with or without preservative such as formalin, to which an anticoagulant may or may not have been added, such as ammonia, is mixed with one or more hydrocarbons, and further coagulation with mineral acids may be applied.

Suitable hydrocarbons, which may be used for this purpose, are turpentine, turpentine oil and other terebenes, benzene, naphthalene, kerosene, mineral hydrocarbons and tar. After mixing coagulation may be effected by means of heat, smoke, concentration, mechanical means, or the addition of acids. The quantity of hydrocarbon necessary is about ten per cent of the latex. (British Patent No. 214,477).

* * *

Concentrating Rubber Latex

Raw or vulcanized rubber latex is converted into a pasty or solid substance, which is capable of being reconverted into its original state by the addition of water, by evaporation in the presence of a protective colloid with or without an anticoagulant. Suitable colloids for this purpose are gelatine, glue, gum arabic, saponin, casein, white of eggs, alkaline albuminates or their decomposition products, such as protalbinates and lysalbinates, etc. As anti-coagulants, alkaline sulphites, iodines, or rhodanides may be employed. The addition of ammonia or an organic base is advantageous. The added substances may also serve as fillers, coloring matters, vulcanization accelerators, etc. British Patent No. 213,886.

* * *

Mixtures of Rubber and Synthetic Resins

Up to the present time it has been very difficult to prepare mixtures of rubber and synthetic resins. The difficulty consisted in obtaining a homogeneous product. The manufacture of such a product possesses considerable interest in the opportunity it offers of securing a substance in which there would be combined the good properties of both rubber and synthetic resins. In order to obtain mixtures, which are perfectly homogeneous, it is necessary to employ a common solvent, a substance which would dissolve one ingredient as readily as the other. And this is something which has not been accomplished up to the present time.

Experiments have been made on this subject by the organization in Germany which is responsible for the development of the colloid mill, a machine which seems to be producing the results that were originally claimed for it. In these investigations it has been found that a mixture of rubber and synthetic resins can be obtained when these substances are dispersed in a medium of chlorhydrin or hydrogenated phenols. Dichlorhydrin and cyclohexanol, and particularly a mixture of these two solvents, appear to be especially well suited for this purpose.

The operation consists in dissolving twenty parts of the phenol-formaldehyde condensation product, the synthetic resin, in one hundred parts of dichlorhydrin. Then five parts of rubber are allowed to absorb and swell up in fifty parts of the same solvent for a period of twenty four hours. The entire mass is mixed together and treated for several minutes in a Plauson colloid mill. In this way there is obtained a very homogeneous mixture which does not separate into its homogeneous parts. *L'Industrie Chimique,* 1924, page 267.

* * *

Rubberized Fabric

A glossy finish is produced on rubberized fabric by dusting with starch, partially vulcanizing in sulphur chloride vapor, and finally completing vulcanization with a solution of sulphur chloride. (United States Patent No. 1479394)